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Outdoor Recreation Classification for British Columbia

- outdoor recreation features
- biophysical limitations

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OUTDOOR RECREATION CLASSIFICATION FOR BRITISH COLUMBIA

- outdoor recreation features
- biophysical limitations

John Block
PARKS AND OUTDOOR RECREATION DIVISION
MINISTRY OF LANDS, PARKS AND HOUSING

Valerie Hignett
TERRESTRIAL STUDIES BRANCH
MINISTRY OF ENVIRONMENT

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TERRESTRIAL STUDIES BRANCH

PREFACE

Numerous government agencies and private industry resource companies are involved in programs that require the collection and analysis of outdoor recreation resource data. Such information is necessary in the provision of outdoor recreation opportunities, management of those opportunities once provided and the minimizing of impacts on the outdoor recreation resource resulting from the use of other natural resources.

A variety of methods have been used to collect information regarding the attractivity and the sensitivity to use of our outdoor recreation resources. This manual is intended to provide a framework within which the collection of such information can be carried out in British Columbia. It is hoped that this will result in better comparability of, as well as more efficient collection of, the necessary information.

The manual in its present format is not a final product. With further application of the inventory system which it describes, ideas will arise for improvement. In order to ensure that a continuous process of refinement in the system can take place, it is requested that pertinent comments be documented and forwarded to the Inventory Coordinator, Parks and Outdoor Recreation Division, Ministry of Lands, Parks and Housing, Parliament Buildings, Victoria. It is intended that the present document will be updated in approximately 5 years.

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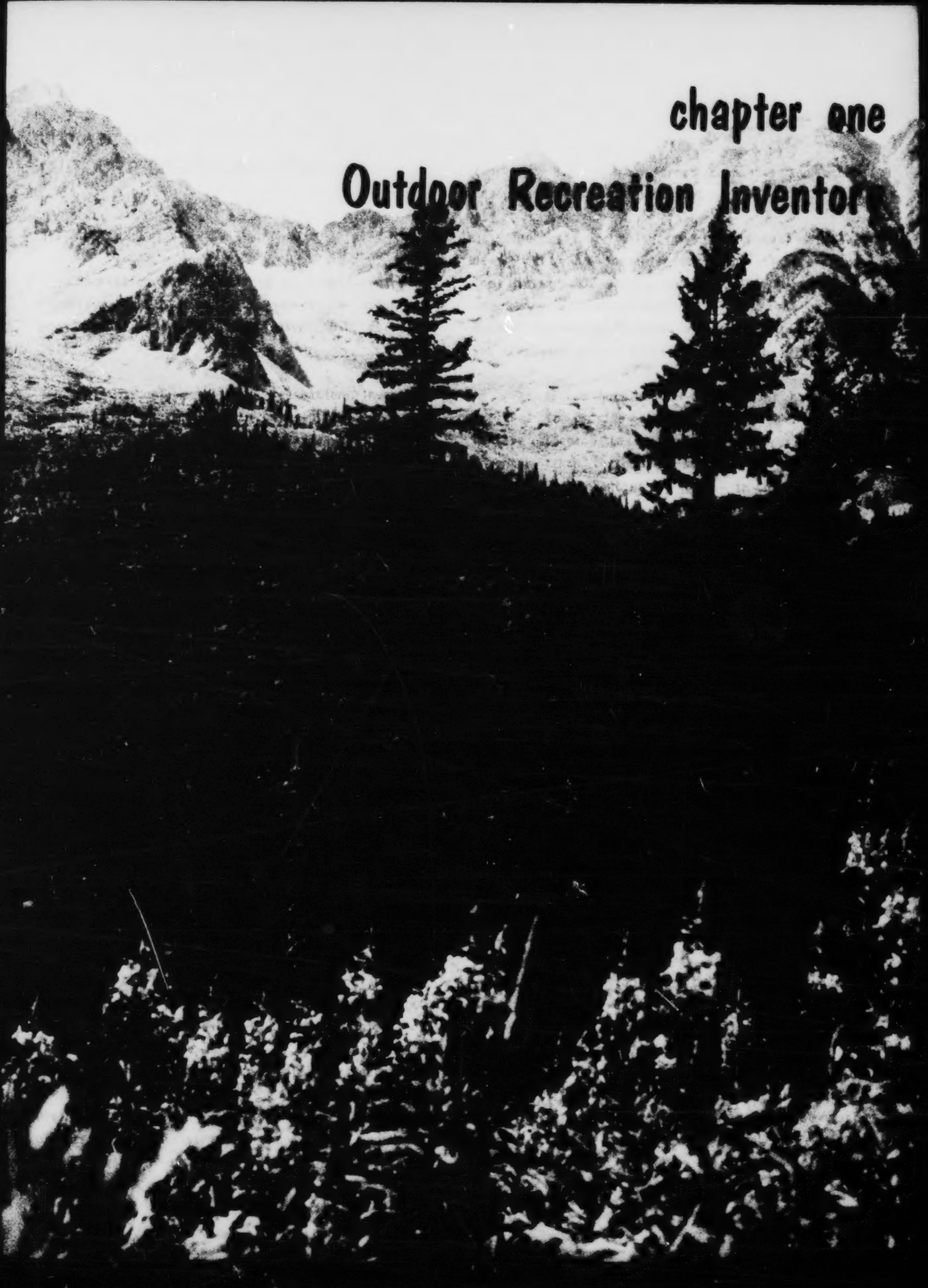
chapter one

Outdoor Recreation Inventory



chapter one

OUTDOOR RECREATION INVENTORY

1.1 Introduction

Recreation can be defined as a self-rewarding experience which finds its source in voluntary engagements during free time (Driver, B.L. et. al., 1979).

This manual details a recreation inventory system which is designed to be used to assess and describe outdoor recreation features and biophysical limitations to outdoor recreation use.

In this system, outdoor recreation features are defined as aspects of the landscape which provide opportunity to engage in outdoor recreation. Vegetation, wildlife, landforms, beaches and springs are examples of these features which are described in detail in Chapter Two. Biophysical limitations are defined as natural landscape elements which determine the inherent ability of land and water units to sustain recreational use. Fine textured soils, poor soil drainage, steep slopes, flooding and sensitive vegetation are examples of these limitations which are described in detail in Chapter Four.

It is intended that the features and limitations information collected when applying this inventory system be of use in outdoor recreation and integrated resource planning and management. These uses may include input into: the allocation of new, or the zoning of existing, parks, recreation areas, or recreation sites; the location and design of recreation developments; environmental impact assessments of industrial developments such as hydro dams, roads and railroads; and the development of integrated resource management plans. Organizations in B.C. which should be able to make use of such information include the Parks and Outdoor Recreation Division, the Lands and Housing Regional Operations Division, the Ministry of Environment, the Ministry of Forests, the Ministry of Transportation and Highways, regional districts with a regional park function, B.C. Hydro, forest companies and other resource development companies.

The basis for this system, which was initially developed by the former Resource Analysis Branch of the Ministry of Environment, is the Canada Land Inventory (CLI) Capability Classification for Outdoor Recreation Program. The CLI mapping program was completed within British Columbia in 1972.

The system outlined in this manual has been designed to provide a more flexible and comprehensive approach to outdoor recreation capability inventory than that which was offered by the CLI program. The intent of the manual is to standardize and describe in detail the methods which have been developed for the features and biophysical limitations inventories so that they may be carried out by any agency, consultant or industry which requires this type of information.

1.2 Manual Contents

The inventory system described in the following chapters and appendices has been designed so that:

a. it may be applied at a broad range of scales from the watershed level (map scale 1:20 000) to the regional level (map scale 1:500 000); and
b. any one of, or any combination of, the elements which make up this system may be used in an outdoor recreation inventory project.

The system consists of:

a. a method for classifying and mapping the land and water for their outdoor recreation values (Recreation Features Inventory, Chapters Two and Three);
b. a method for assessing the inherent ability of the land and water to support outdoor recreation use (Biophysical Limitations to Outdoor Recreation Use, Chapters Four and Five and Appendix IV); by separately

assessing recreation features and biophysical limitations to recreation, the problems which occur when one class number is used to 'average' a unit's ability to attract use and its ability to support use is avoided; this was one of the major criticisms of the Canada Land Inventory Capability Classification for Outdoor Recreation Program;

c. a method for carrying out interviews with persons who are knowledgeable about the outdoor recreation features of an inventory area (Appendix I);
d. a standardized inventory card which can be used in the field to record detailed descriptions of recreation features and biophysical limitations (Appendix II);
e. a method for organizing slides and prints which have been taken during the field inventory phase so that they can be most efficiently used during preparation of maps and reports (Appendix III);
f. a set of detailed guidelines which can be used in the assessment of the biophysical limitations to recreational use (Appendix IV); and
g. an example outdoor recreation features 1:50 000 map legend (inside back cover of the manual).

In addition, the following information is also provided which could be of use in outdoor recreation inventories that are carried out using the system described in this manual.

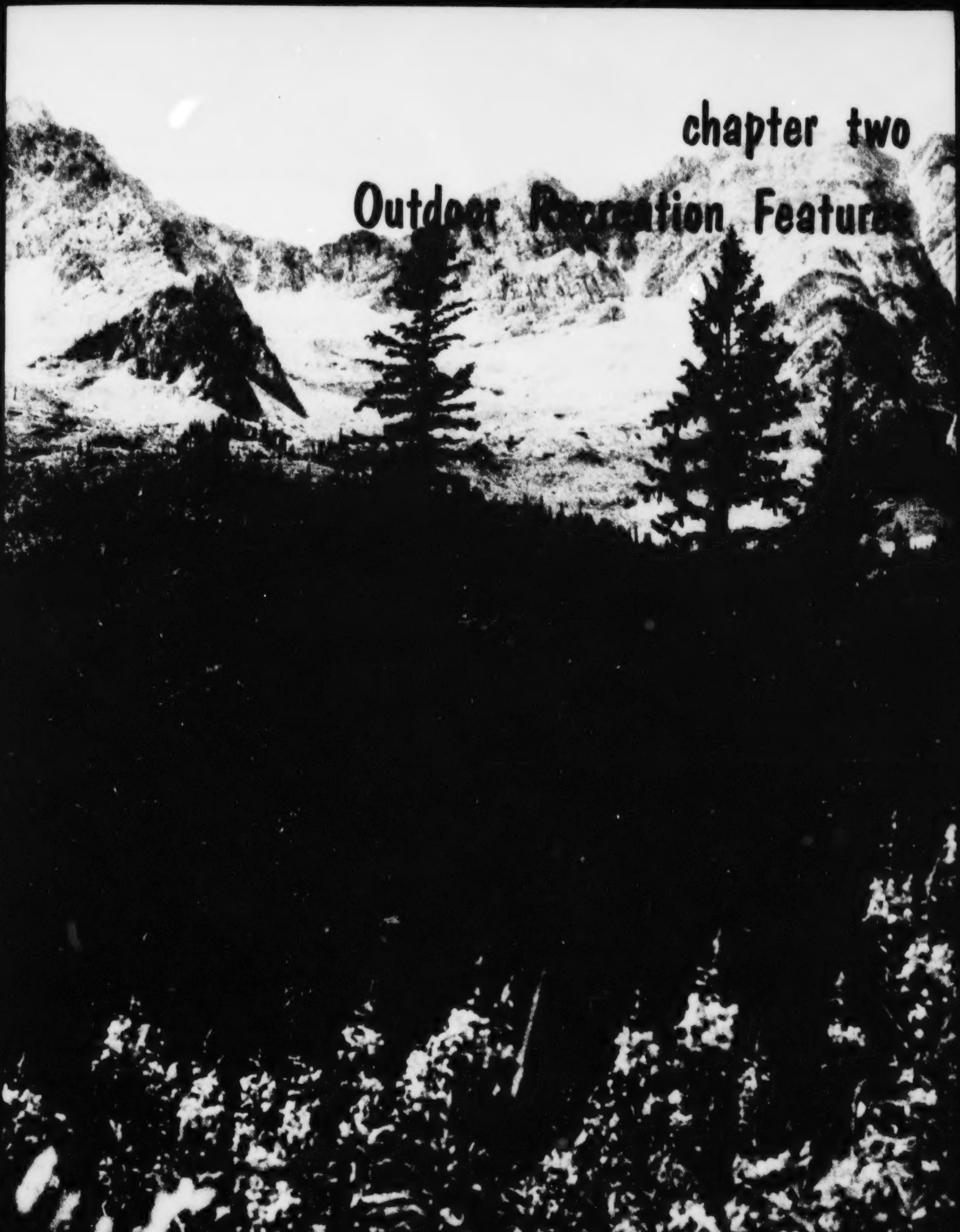
a. A review of the Canada Land Inventory System, with a description of how to interpret the information which has been provided in the CLI Recreation Capability maps (Appendix V);
b. a description of a method which can be used to carry out an inventory of outdoor recreation facilities (e.g., campsites, boat launch ramps) and land designations (e.g., Provincial parks, recreation reserves) (Appendix VI);
c. a review of the Recreation Opportunity Spectrum (ROS) which has been developed in the United States to identify recreation opportunity outputs from the land, and to provide an estimate of the quality of each recreation opportunity provided (Appendix VII);
d. a glossary of key terms (Appendix VIII).

References

Driver, B.L. et.al. 1979. Interim Guidelines for Outdoor Recreational Resource Management Planning. Rocky Mountain Forest and Range Experiment Station, U.S. Forest Service, Fort Collins, Colorado.

chapter two

Outdoor Recreation Features



chapter two

OUTDOOR RECREATION FEATURES

2.1 Introduction

As described in Chapter One, outdoor recreation features are aspects of the landscape which provide opportunities to engage in outdoor recreation activities. The outdoor recreation features inventory system described in this chapter provides:

a. a method for systematically subdividing the landscape into identified units of outdoor recreation features; and
b. a method for assessing the significance or natural attractivity of these units.

The recreation features information which is collected can be applied in: park master planning and systems planning for regional and provincial park purposes; the location of recreation sites; environmental impact assessments; and, outdoor recreation inputs into integrated resource management projects. As described in more detail in section 2.5.8, these inputs may range in detail from the watershed to the regional planning level.

In this chapter, five classes of feature significance are described, followed by an identification of five groups of outdoor recreation features. A summary legend of all the described features is then provided (Table 1). Finally, a description is given of the mapping conventions used in an outdoor recreation features inventory.

2.2 Feature Significance

Quality is the primary basis for assessing the five categories of feature significance. This is related to a feature's "attractivity" or ability to hold a person's interest. Any one feature should be ranked on the basis of that kind of feature only. For example, a wildlife feature should be rated only in relation to other similar wildlife features.

In the rating of a feature, uniqueness to the region, province and country should be considered. For instance, is the feature common to the region, is it rare in Canada?

Present accessibility should not be considered in rating the significance of a feature. Whether a section of a stream is accessible by road or 100 miles away from the nearest town does not affect the natural recreation value of that unit. As a result, new road development and resultant change in accessibility will not cause a change in significance rating. Although existing access will not affect the significance of a feature rating, it will affect the type of recreation activity which can take place at the time of the inventory related to that feature.

2.2.1 Feature Significance Classes

* Very High Feature Significance

Units in this class contain features which have a very high ability to attract recreational use. They could be of national significance.
Examples include: Takakkaw Falls, Yoho National Park; Mount Edziza (Rock Feature); Fort Rodd Hill (Historic Site); Cathedral Grove (Vegetation).

++ High Feature Significance

Units in this class contain features which have a high ability to attract recreational use. They could be of provincial significance.
Examples include: Shannon Falls, Howe Sound; Hudson's Bay Mountain (Rock Feature); Sandon (Historic Site); Black Tusk Meadows (Vegetation).

+ Moderate Feature Significance

Units in this class contain features which have a moderate ability to attract recreational use. They could be of regional significance.
Examples include: Niagara Cr. Falls, Goldstream Park; Columnar Basalts, Garibaldi area (Rock Feature); Estella Mine, East Kootenays (Historic Site); Ponderosa Pine - Douglas fir parkland in the Okanagan (Vegetation).

- **Low Feature Significance**

Units in this class contain features which have a low ability to attract recreational use. They have a natural attractivity that is common throughout the map area.

Examples include: intermittent falls, Coast Mountains; rock exposure along coastline of eastern Vancouver Island; old farm building in the Okanagan, history unknown (Historic Site); Mixed Trembling Aspen, Coniferous forest stands in the Chetwynd area (Vegetation).

= **Very Low Feature Significance**

Units in this class have a very low ability to attract recreational use. There are usually no features which stand out. There may, however, be some attraction for specialized recreational activities or the units may merely provide open space. Examples may include a dense coniferous forest on moderate to steep slopes or an area of transitional vegetation such as a burned area or logging clearcut. If these areas provide a buffer to adjacent features of moderate to very high significance they may be given a low to moderate significance rating.

2.3 Outdoor Recreation Features and Sub-Features

In this section five main groups of outdoor recreation features are identified. These are:

a. Biotic - which includes aquatic, vegetation and wildlife features;
b. Physical Geographic - which includes glacier and icefield, landform, topographic, rock, and viewing features;
c. Water Oriented - which includes beach, hydrologic, waterfall and rapid, coastal, small surface water, large surface water, spring and harbour features;
d. Cultural and Historic - which includes native Indian, European/pioneer and cultural features; and
e. Miscellaneous features.

The features in each group are subdivided into more specific sub-feature categories which are described in detail.

2.3.1 Biotic Feature Group

A. Aquatic Feature

Four sub-feature categories are recognized. These sub-features describe aquatic flora and/or fauna of significant outdoor recreation interest. In general, use of these symbols (A1, A2 etc.) should be applied to the water body being described (map scale permitting) rather than to the adjacent land area.

A1 - Sport Fish

Sport fish populations. Although this sub-feature is normally associated with salmon or trout, description of other species populations, where known, such as halibut, cod, whitefish, grayling and char may also be of value.

Factors to be considered in rating the significance of this sub-feature include: fish population size, average size of fish; numbers of game fish species present; occurrence of man-made or natural drawdown; flooding or turbidity and; potential physical access to the area (e.g. is it within a deep narrow rock canyon?).

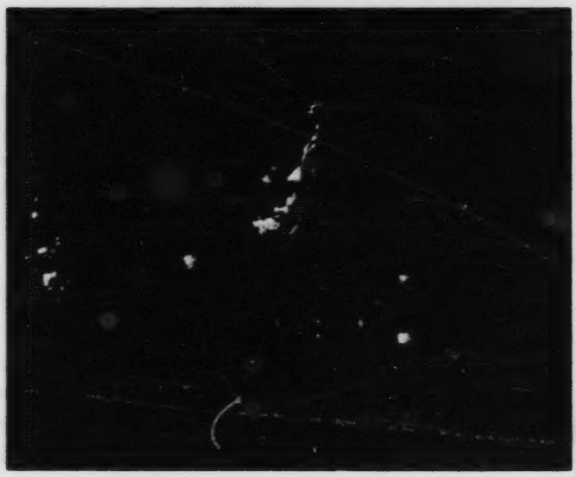


Plate 1. A Rainbow trout being taken from Dee Lake west of Winfield in the Okanagan. The lake, which is of moderate significance, offers angling and canoeing opportunities (A^1aNc+). See section 2.5 for an explanation of the mapping conventions used to determine the recreation feature symbols provided with the description of each plate in this chapter.

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*feature symbols are provided at the top of each page to aid in their location within the text of this chapter.

A2 - Aquatic Habitat

Habitat where a variety of marine or fresh water flora and fauna occur for long periods of the year. Examples include tide pools, estuaries, bogs, ponds and potential underwater diving areas.

Factors to be considered in rating the significance of this sub-feature include: evidence of man-made intrusions; and, variety of the flora and fauna.

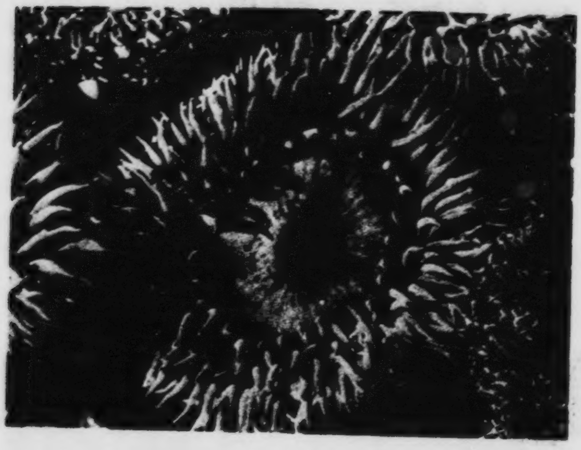


Plate 2. An anemone on Botanical Beach, southwest Vancouver Island. The erosion-worn depressions in the rock platform foreshore of this area have formed tidal pools which support a diversity of marine species. It is a unit of high significance for nature interpretation ($J^5A^2 + +$).

A3 - Fish Run Observation

Cyclic or periodic aquatic features (i.e., anadromous fish runs and spawning in fresh water streams).

Factors to be considered in rating the significance of this feature include: the size of the run; periodicity (large run every year, large runs only every four years); whether it is a spawning area or only a migration route; and, the number of fish species which use the waterbody as a migration and/or spawning channel.

Plate 3. A spring salmon trying to negotiate Meziadin Falls during its spawning migration. This feature unit includes a fish ladder and is of high significance ($F^1A^3P^4 + +$).

A4 - Aquatic Foods

Habitat where concentrations of common aquatic foods occur such as clams, crabs, oysters, prawns and seaweed. Factors to be considered in rating the significance of this sub-feature include: variety of foods which occur; quality of available foods; and, length of year during which one or more of the food species are palatable.

Plate 4. Clam digging on the east coast of Vancouver Island. A common year-round recreation opportunity along the B.C. coast ($A^4B^2 -$).

E. Vegetation Feature

Eight vegetation sub-feature categories are described according to the growth forms of the dominant plants which occur. E8 (Transitional Vegetation) is an exception to this rule.

As vegetation cover often has a strong effect on recreational value, vegetation sub-features will commonly be identified unless a unit has three other over-riding feature values. Section 2.5.6 of the manual identifies a mapping procedure which can be used when there are no other significant feature values and the vegetation feature significance for an area is very low.

If any vegetation sub-feature is considered to be rare or unique an annotation symbol can be used to indicate that further information is available (see section 2.5.3).

E1 - Alpine - High Subalpine

At the upper extent, treeless regions of high altitude or latitude which support a variety of cold and drought resistant lichens, sedges, low matted shrubs and herbs. Not more than 75% of the area can be exposed rock. At the lower extent, individuals and clumps of trees that are, due to severe climatic conditions, stunted and shrublike. These trees are usually dense, becoming more prostrate, more twisted and contorted with altitude. Interspersed with the tree species are areas which support plants found in alpine communities, or, in wetter areas, subalpine meadows rich in flowers.

Plate 5. Rocky Mountains north of McBride. An area of moderate significance having a combination of features which includes alpine vegetation, small tarns and topographic diversity. Recreational opportunities include excellent viewing, wilderness hiking and camping.

Factors to be considered in rating the significance of this sub-feature category include: the diversity of the plant species which occur; the extent and lushness of the plant cover (is it intermittent with exposed soil and rock, is it continuous and lush?); size of the unit; and, length of the snow-free period.

E2 - Transitional

Areas which are dominated by vegetation cover that is in a transitional stage often as a result of human or natural disturbance. Examples include logging clearcuts, burns and slide areas.

Factors to be considered in rating the significance of this vegetation sub-feature include diversity and size of the unit.

Plate 6. Burned and partially felled area in Manning Park. This example of transitional vegetation (E^2) will change over time with natural regeneration. These areas are often of low or very low significance offering limited recreational opportunities.

E3 - Coniferous

Areas dominated by forests which are composed of coniferous tree species that range in crown cover from greater than 25% of the area to a fully closed dense canopy. Deciduous tree species occupy less than 10% of the area.

Factors to be considered in rating the significance of this sub-feature include: diversity of the tree species present; density of the tree cover (potential ease of movement, visibility and diversity); and size of the unit.

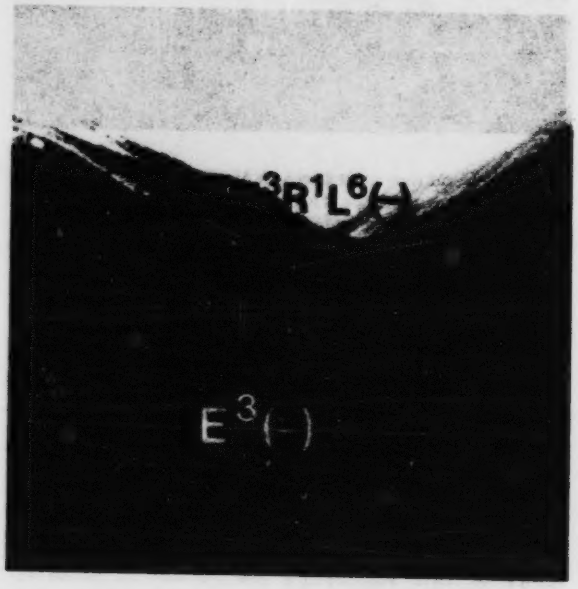


Plate 7. Dense coniferous vegetation in the interior of the province. An area of very low significance offering little variety or recreational opportunity ($E^3 =$). The same type of area may be of higher value if it is part of a scenic viewing corridor or if it is adjacent to and acts as a buffer zone to a highly significant recreational area.

E4 - Deciduous (Broadleaf)

Areas dominated by forests which are composed of a single or a variety of deciduous (broadleaf) tree species which range in crown cover from greater than 25% of the area to a fully closed tree canopy. Coniferous tree species occupy less than 10% of the area.

Factors to be considered in rating the significance of this sub-feature are similar to those for the E3 sub-feature category.

Plate 8. Deciduous vegetation near Merritt. This unit of trembling aspen is of low significance. It is fairly common in the area and offers opportunity for viewing, camping and picnicking (E^4Vk-).

E5 - Mixed

Forests composed of both coniferous and deciduous tree species with each type occupying greater than 10% of the area. The total tree coverage is greater than 25%.

Factors to be considered in rating the significance of this sub-feature are similar to those for the E3 sub-feature category.

Plate 9. Mixed forest along the east coast of Vancouver Island. An area of low significance (E^5-) with enough topographic and vegetative variety to provide limited hiking opportunities.

E6 - Parkland

An area which supports scattered trees (coniferous or deciduous) that provide more than 1% but less than 25% tree cover. Vegetation cover in the remaining openings is mainly composed of grasses, herbs or open brush. This parkland vegetation is characteristic of drier climates or higher elevations. An example of the latter is the mountain hemlock parkland on the west coast of B.C. which is composed of a combination of full sized trees interspersed with sub-alpine meadows.

Factors to be considered in rating the significance of this sub-feature category include: the diversity of tree species in the forested areas and lower vegetation in the openings; and the variety of the openings which could range from being of consistent size and shape to being very diverse in nature.

Plate 10. A parkland of Ponderosa pine near Princeton that is of moderate significance. It offers opportunity for a variety of recreational activities including viewing, hiking, riding, camping and picnicking (E^6VQ^2+).

E7 - Non-Forested

Areas with less than 1% tree cover for reasons of dry climate or natural and persistent disturbance. Included in this category are grasslands, savanna, persistent shrub communities and avalanche tracks. Cultivated areas, pastoral landscapes and logged areas which will restock with trees are not included.

Factors which should be considered in rating the significance of this sub-feature include: the variety of plant species which occur; the extent and lushness of the plant cover; and the size of the unit.

Plate 11. St. Mary's Prairie near Cranbrook in the East Kootenay. The combination of grassland in the foreground (E^7) and forest parkland in the background (E^6) offers viewing and campsite development opportunities. This area is also an elk winter range, ($E^{6,7}kVW^3+$).

E8 - Wetland

Plate 12. A floodplain of moderate significance in the Rocky Mountains. The small river is navigable by canoe and the open wetland vegetation attracts a diversity of wildlife species. The side slopes on the left with numerous avalanche tracks support a complex of coniferous and non-forested vegetation.

These are areas where periodic or persistent water inundation and saturation occurs as a result of local seepage, flooding or other reasons. The vegetation of the wetlands will reflect these conditions. Examples include marshes, swamps, fens, bogs and wet meadows.

Factors to be considered in rating this sub-feature include diversity of plant species and size of the unit. These areas will often support diverse wildlife populations and will be identified in these cases by a combination of this sub-feature category with wildlife sub-feature descriptions.

W. Wildlife Features

This feature category describes land, water and wetland areas which support wildlife species, primarily mammals and birds. This description is usually applied to areas which support concentrations of animal populations or at least populations which are more significant than those which occur in a general study area.

Five sub-feature symbols are used to identify areas within which wildlife is observable and which, therefore, offer opportunities for nature interpretation and appreciation.

If any wildlife sub-feature is considered to be rare or unique an annotation symbol can be used to indicate that further information is available (see section 2.5.3).

Factors which should be considered in rating the significance of these sub-features include: regularity with which wildlife species use the area; number of individual animals and total number of different species observable in the area; ease of observation of species; time (or period) of the year during which species use the area; and, the possibility that wildlife observation in a particular area will provide opportunity for learning an aspect of the life history of a species. The general terrain of an area, vegetative cover and the occurrence of water bodies will have a strong influence on the observability of many wildlife species.

W1 - Upland and Aquatic Birds

Areas which provide opportunities to view concentrations or significant populations of upland game birds, passerines, raptors, waterfowl, shorebirds or pelagic birds.

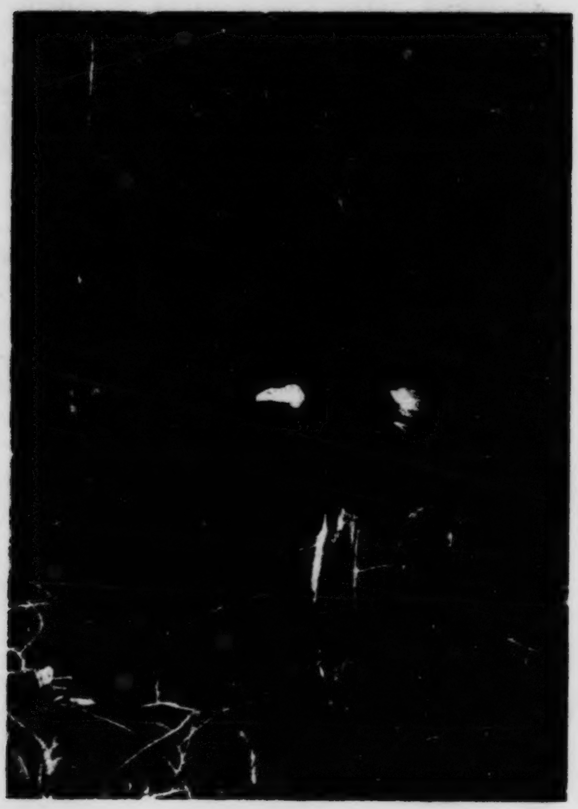


Plate 13. A Bald eagle on the banks of the Squamish River, an area well noted for opportunities to view large numbers of this species during the salmon spawning period. These sections of the river with wildlife observation, angling and canoeing opportunities are of high recreational significance ($NcA^1aW^1 + +$).

W2 - Small Mammals

Areas which provide opportunities to view concentrations or significant populations of small mammals including ground squirrels, marmots, beavers, muskrats and rodents.

Plate 14. A family of Columbia Ground squirrels in Manning Provincial Park. An area of low significance where numbers of these animals are easily observed ($W^2V -$).

W3 - Large Mammals (Land)

Areas which provide opportunities to view concentrations or significant populations of wild ungulates such as elk and moose and large carnivores such as bears and wolves.

Plate 15. Bighorn Sheep on Premier Ridge in the East Kootenays. Few other locations in North America provide the opportunity to readily view the diversity of large mammals (7 species in addition to the bighorn sheep) as does this area ($E^2,{}^5W^{3*}$).

W4 - Marine Mammals

Areas which provide opportunities to view concentrations or significant populations of marine mammals including whales, seals and sea lions.

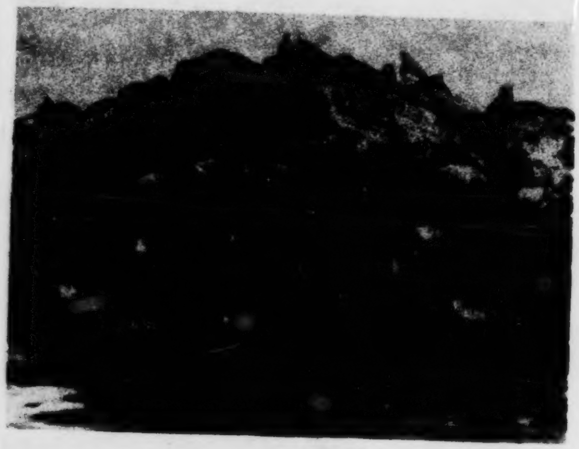


Plate 16. Sea Lion colony on Race Rocks just off Victoria. An area of high significance with opportunities to readily view sea lions, seals and a number of waterfowl species ($W^{4.1}R^1 + +$).

W5 - Wildlife Diversity

Areas which provide opportunities to view concentrations or significant populations of two or more of the above categories. For example a wetland unit which supports populations of aquatic birds (W1) and small mammals (W2).

Plate 17. Goldstream estuary, Vancouver Island. This area supports diverse and highly productive biological communities and provides excellent opportunities for nature interpretation. The unit is of moderate significance ($J^1VW^5 +$).

2.3.2 Physical/Geographic Feature Group

G. Glaciers and Icefields

Two glacier and icefield sub-feature categories are recognized.

G1 - Glacier

Site specific glacier features, such as: cirque glaciers which occupy a cirque or remain on a cirque headwall; hanging glaciers high on the sides of mountains which, in many cases terminate at cliff faces; and, distinguishable icefalls and ice tongues generally characterized by one or more crevasse zones.

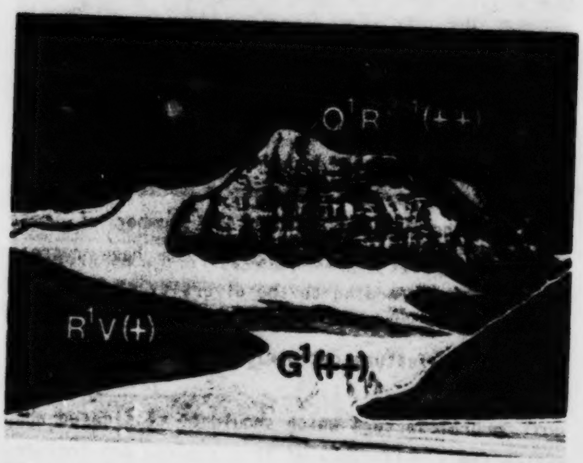


Plate 18. Glacier in the Clemenceau Icefields of the Rocky Mountains. An area of high significance offering excellent alpine opportunities.

Such associated features as cirques, moraines and rock glaciers are incorporated into the Landform features (L) category.

G2 - Icefield

Icefields, which are distinguished from glaciers by their larger size and more extensive areas of permanent ice development, covering all but the highest peaks and characterized by gentle gradients and minimal crevasse zones. In many instances they spawn glacial icefalls and tongues which, if distinctive from the parent icefields, should be mapped separately.

Plate 19. Conrad Icefield north of Kootenay Lake. An area of moderate significance (G^2+).

L. Landform Features

Various erosional and depositional processes (i.e., wind, water, ice, failing slopes) have resulted in the development of a variety of landforms on the earth's surface. A number of these landforms, if pronounced enough, can have recreational value by adding to the diversity of the landscape and providing viewing interest. Eleven landform sub-feature categories are described.

General factors which should be considered when rating the significance of this sub-feature include: size; form (how classic is it, or is it modified to some degree?); visibility (is the landform clearly visible with a different line to its surroundings, or is it lacking contrast and/or obscured by vegetation?); setting; and educational value (how clear is the history or evidence of origin of the landform?).

L1 - Glacial Ice Melting

Landforms resulting from glacial ice disintegration and meltwater. Included in this category are landforms such as kames (conical hills, mounds or short irregular ridges deposited by glacial meltwater), kettles (bowl-like depressions formed when an ice block melted while buried in glacial drift material), eskers (serpentine-shaped ridges of gravel and sand deposited by streams within a decaying glacier), meltwater channels and crevasse fillings.

Plate 20. Distinctive kame and kettle topography close to Hat Creek. An area of moderate significance with grassland and parkland vegetation and numerous small lakes which provide a diverse landscape for hiking, riding and winter recreation activities ($E^{6.7}L^1sM$+).

L2 - Glacial Ice Movement

Landforms and features which are formed by and indicate the direction of flow of glacial ice. Examples include drumlins (a streamlined hill or

Plate 21. Glacial grooves in bedrock, Lillooet Valley. An area of low significance with opportunities for viewing and interpreting glacial features (L^2R^1V−).

ridge of glacial drift with the long axis paralleling the direction of the glacier flow) and glacial striations and grooves in bedrock.

L3 - Periglacial

Low temperature and frost-induced landforms occurring in areas marginal to glaciers and in alpine-subalpine areas. Examples include rock glaciers, block or stone streams, and patterned ground (symmetrical surface forms such as circles, polygons, hummocks and steps characteristic of intensive frost action).

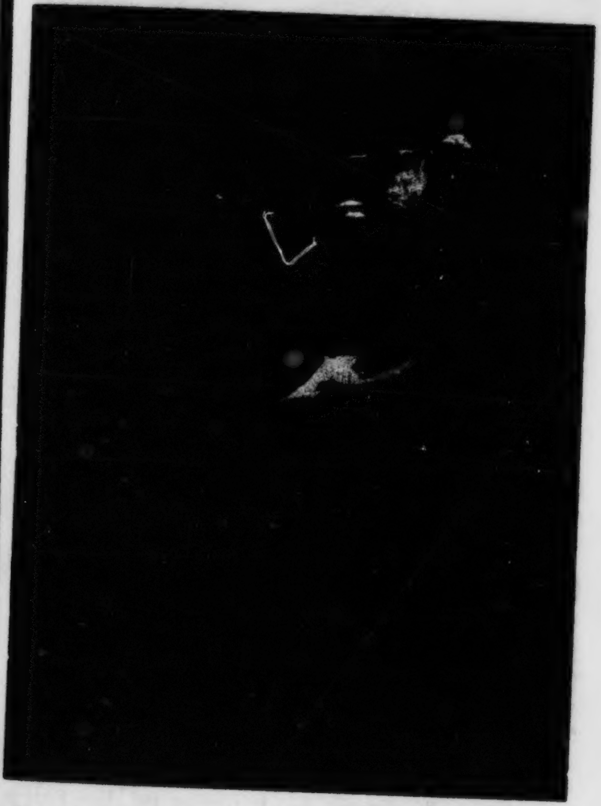


Plate 22. Rock glacier on Mt. Abruzzi in the East Kootenay . A landform sub-feature of moderate significance due to its relatively large size and the striking contrast to the surrounding landscape.

L4 - Moraine Ridges and Cirques

Cirques are rounded rock basins formed by glacial erosion. They are characterized by moder- tely sloping or undulating floors that are usually in sharp contrast to the surrounding steep sidewalls. Small lakes or tarns and lateral moraine ridges, (unstratified drift deposited by direct glacial action), are frequently present on the basin floor. This category also includes moraine ridges that are not associated with cirque basins.

Plate 23. Cirque basin with a tarn (lake) and associated morainal features (lower left) in the Coast Mountains. An area of moderate significance with subalpine vegetation and topographic diversity providing viewing, hiking and wilderness camping opportunities (L^4kE^1V+).

L5 - Karst

Karst is a type of topography resulting from

Plate 24. An example of karst solution of limestone in the Rocky Mountains. This very deep cave would be large enough to be designated on a 1:50 000 map as a site specific sub-feature of moderate significance (L^5R^2+)*. An annotation may be applicable to further describe the cave (see section 2.5.3).*

the solution of carbonate rock; usually limestone and rarely gypsum. Examples include caves, caverns and sinkholes.

L6 - Avalanche Tracks, Talus and Scree

This category refers to areas undergoing modification by snow avalanches or where weathered debris (talus or scree) accumulates at the foot of a steep rockface as a result of erosion. They commonly occur on steep valley sidewalls of mountain ranges and create landscape and vegetation patterns which contrast with the adjacent terrain.

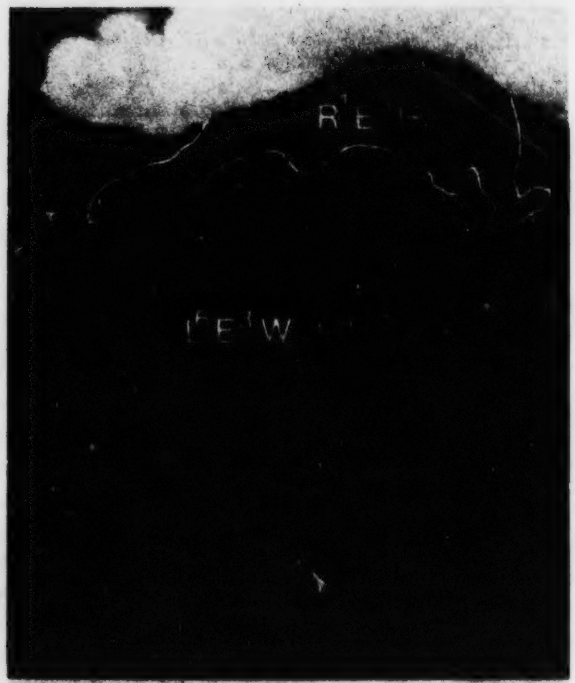


Plate 25. Avalanche paths in the Rocky Mountains. The shrub vegetation in the snow avalanche tracks is distinct from the adjacent slopes and offers visual diversity to the area as well as opportunity to view wildlife.

Plate 26. Talus in the Keremeos area. These landforms add to the visual diversity and interest of the slope.

L7 - Landslides

These landforms are produced by mass movement processes and include rock slides and mud flows.

Plate 27. A landslide in lacustrine silts near Spences Bridge in the Thompson Valley. This sub-feature is of moderate significance as it provides an opportunity to interpret an extensive recent modification of the earth's surface (L^7+). In contrast, the Hope Slide is considered to have very high significance.

L8 - Canyons, Escarpments and Hoodoos

Included in this category are canyons or gullies created in rock or unconsolidated materials by water erosion, escarpments in unconsolidated material and hoodoos (pillars developed in horizontally bedded strata by water erosion).

Plate 28. A bedrock canyon of moderate significance in the East Kootenay, ($ML^8R^1 +$).

Plate 29. Hoodoos at Dutch Creek near Columbia Lake. These are formed by the erosion of horizontally bedded strata of varying hardness. There are several of these sub-features in the East Kootenay region where rainfall is concentrated during a short period of the year. This particular example is of high significance as it is one of the largest and most distinctive in B.C. ($L^8VQ^2 + +$).

L9 - River and Stream Deposits

Landforms created from the deposition of materials by rivers or streams. Examples include deltas, fans, terraces and braided stream channel deposits.

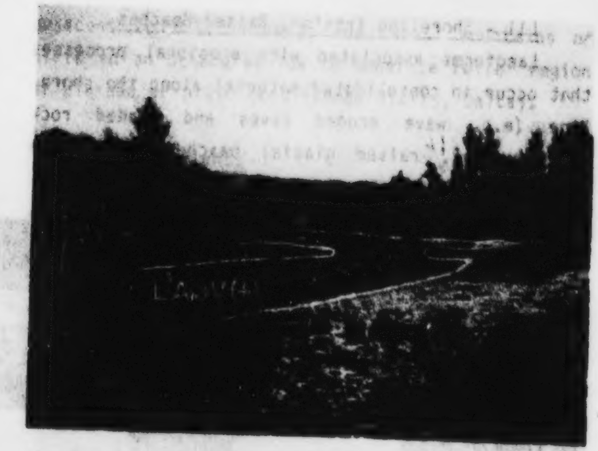


Plate 30. Elk River in the East Kootenay. The gravel bar in the foreground offers viewing and angling opportunities whereas the vegetated backshore unit offers excellent camping and picnicking opportunities.

L10 - Windblown Deposits

Materials that are transported and deposited by wind action. Examples include dunes and surface mantles of sand or coarse silt.

Plate 31. Coastal sand dunes at Cape Scott, northern Vancouver Island. It is an area of high significance ($B^2L^{10}V + +$) for viewing, hiking and nature interpretation.

L11 - Shoreline Erosion, Raised Beaches

Landforms associated with erosional processes that occur in consolidated material along the shoreline (e.g. wave eroded caves and eroded rock cliffs); and, raised glacial beaches which were deposited above present water levels. Post glacial beaches on existing shores and a number of other coastal features (estuaries, tidal marshes, spits) are described separately in section 2.3.3.

Plate 32. Shoreline erosion in sedimentary bedrock on the east coast of Galiano Island. This is one of a number of such sub-features on the Gulf Islands which show a diversity of striking erosion patterns in the exposed rock ($L^{11}R^{1}+$).

Q. Topographic Features

This feature category describes: 1) elements of a region's landscape which are topographically distinct and provide recreational interest; and, 2) diverse patterns of the natural landscape which provide opportunity for a wide range of dispersed activities (hiking, horseback riding) in an attractive setting. Three sub-feature categories are recognized.

Q1 - Regional Topographic Patterns

A change in a pattern of topography, landform and landscape which results in a dominant visual attribute within a region. They are usually relatively large units of land with local relief frequently exceeding 300 meters. Examples include: mountain slopes adjacent to plateau areas and major valleys (west slopes of the Front Ranges in the East Kootenay); and, isolated mountains dominating a plateau region of low to moderate relief (Crowsnest Mountain).

See Plate 33 on page 19.

Plate 33. Garibaldi Mountain; a landscape sub-feature of high significance that is a dominant visual attraction of the Squamish region (Q^1R^1 + +).

02 - Local Topographic Patterns

Diverse patterns of topography, landform and landscape ideally suited to dispersed uses such as hiking, riding, exploration, and photography. Normally, units of local topographic patterns are relatively small in extent and generally exhibit local relief of less than 300 meters. Examples include: alpine/subalpine ridges and basins; attractive rolling landscapes (Tobacco Plains, East Kootenay); small areas of flat to gentle topography in an otherwise mountainous region (Skagit Valley adjacent to U.S. border); and, small mountains or hills in an otherwise low to moderate relief region of plateau or plain (Englishman Bluffs, Delta).

Plate 34. A small knoll in the Ootsa Lake area. Such a sub-feature is of moderate significance, adding diversity to the local landscape and providing viewing and hiking opportunities ($Q^2E^{3.6}Vk$ +).

Q3 - Shorelands

The shorelines of lakes, the ocean, and occasionally large rivers where concentrated use features such as beaches, or potential for camping and lodging do not normally occur, but where it is important to identify the intrinsic value of a shorezone from a recreational point of view. Examples include: extensive, steeply sloping shorelands along inlets and other predominately mountainous marine shores (Toba Inlet); steep, non-canyon areas along rivers and streams (portions of Fraser Canyon); and, shorelands along portions of certain reservoirs (Hayward lake) and large lakes. These areas are usually characterized by moderately rapid to rapid drop-off from the waters edge.

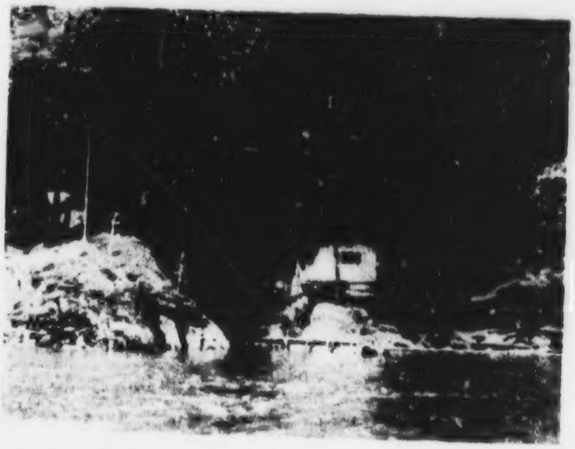


Plate 35. Pitt Lake shoreline. An area of moderate significance for viewing. Cottage development along such shorelines would usually be inappropriate due to terrain and sewage disposal limitations although, as shown, it does occur (Q^3V +).

R. Rock Features

This feature category describes rock features resulting from geological processes which have occurred below the surface of the earth or from surface erosion and weathering processes. The recreational significance of rock features are based on a number of factors including size, form, visibility, colour, setting, educational value, variety and relief. Five rock sub-feature categories are recognized.

R1 - Bedrock Exposure

This category applies to exposed bedrock sections that do not have significant structural characteristics. Examples include bedrock knolls and ridges, escarpments and cliffs.

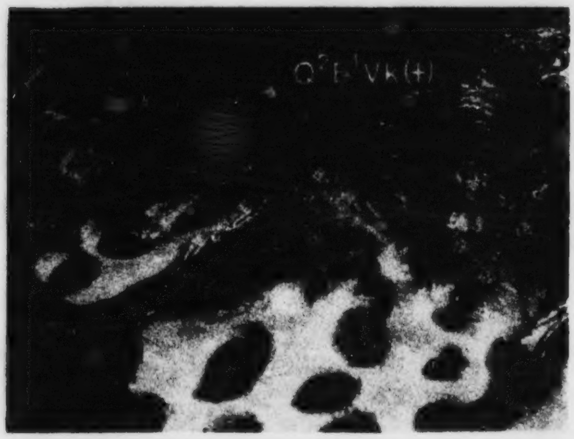


Plate 36. A combination bedrock-hydrologic feature in the subalpine near Mt. Abruzzi in the Rocky Mountains. The attractive water colour is due to suspended silt and clay particles. This area is within an extensive alpine–subalpine area and is of high significance.

R2 - Internal Structural Rock Exposures

Exposed bedrock that possesses visible structural characteristics. Examples include bedded or folded rock formations, faults, synclines and anticlines.

See Plate 37.

R3 - Mineral Deposits

Areas in which minerals or semi-precious stones occur such as rhodonite, jade, gold and agate. This category usually refers to areas where minerals can be, or have the potential to be, fairly readily observed.

See Plate 38.

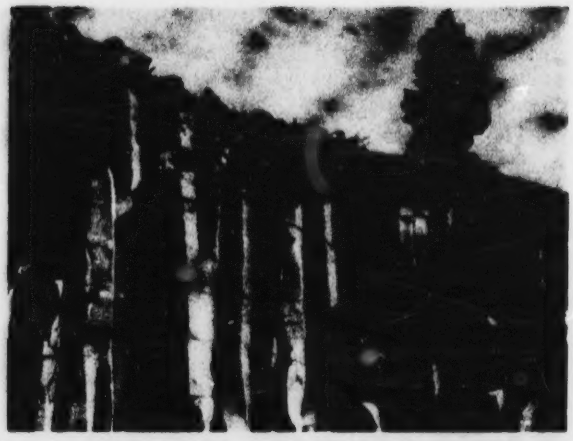


Plate 37. Columnar basalts near Keremeos. This is an example of a structural rock sub-feature which is of moderate significance (R^2+).

Plate 38. Panning for gold in Gold Creek, west of Lake Koocanusa in the East Kootenay; a stream which also has angling potential and is of moderate significance (MR^3A^1a+).

R4 - Fossils

Remains or impressions of plants or animals of prehistoric ages which have been preserved in the strata of the earth and are now exposed through erosional processes. Examples of fossil localities are the trilobites of the Mount Burgess shales, the icthyosaurs of the Peace River Group (now covered by Williston Lake) and the marine shells of the Nanaimo Group on Saltspring Island.

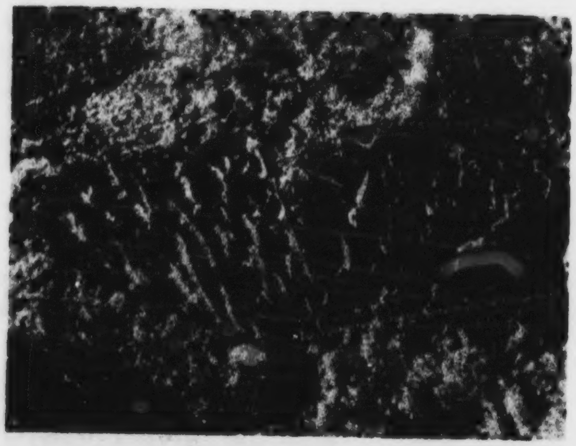


Plate 39. Marine coral fossils in the Stoney Lake area of the northeast Rocky Mountains. The abundance of these fossils make this particular area of moderate significance (R^4 +).

R5 - Volcanic

This category refers to features associated with volcanic activity. It includes structural features such as bedded or columnar basalts, volcanic tephra (ash) deposits and volcanic landforms such as cinder cones and lava flows.

Plate 40. Mt. Edziza Provincial Park, an extensive area of very high significance dominated by relatively recent volcanic features such as Eve cinder cone (R^{5*}). This area is unique within Canada.

V. Viewing

Locations or areas from which either high quality and/or frequent views are possible. The significance of the scenic landscape features being viewed is assigned to the area of observation.

Vantage or viewpoints along roadways and travel corridors which provide attractive vistas and panoramic views are applicable. Larger areas, either presently used or having potential for use, are symbolized when they provide frequent, repeated view opportunities. Notable examples are alpine units, high mountain passes and high elevation water bodies.

As the presence of water usually improves the quality of most scenic viewing, rivers and standing water are often associated with this feature symbol.

Plate 41. Looking NE across the Kootenay Valley from a constructed viewpoint adjacent to the highway in Kootenay National Park. This portion of the highway from which the viewing opportunity occurs would be rated as moderately significant (VP^4 +).

It is of value to note that analysis of the visual resource, although incorporated into an assessment of a viewing site, relates to the total environment. This technique has become a recognized resource management function in North America which is often associated with one of its principal expressions - outdoor recreation. Thus, the reader wishing to pursue their interest in visual resource analysis is referred to guideline subject matter listed in the references at the end of this chapter.

2.3.3 Water Oriented Feature Group

B. Beaches

Beaches, whether shorelands of fresh or marine waterbodies, are valuable outdoor recreational features as they provide a focus for a wide range of potential outdoor recreation activities. They are defined here as part of a shoreland adjacent to and extending into a body of standing water or a river and consisting of level to moderately level sloping deposits of material ranging from clay to rock rubble. Beaches identified on lakes will usually be more stable than those identified on rivers and, in some cases, along marine foreshores. In addition, sections of rivers will usually be identified as supporting beaches rather than identifying specific beach locations on the river.

A great variety of physical factors are important in rating the significance of a beach. These factors include: texture of beach materials; gradient (should be under 15%); width; length; offshore conditions; backshore conditions; occurrence of inundation either due to tidal action or fluctuating lake levels; and, beach stability.

B1 - Fine Textured Beach

Plate 42. A fine textured beach on Windermere Lake. The silt, very fine sand and clay texture as well as the aquatic vegetation present make this a beach of low significance that is unattractive for bathing activities (B^1V –). The adjacent shoreline is of moderate significance offering excellent viewing, camping, picnicking and winter activity opportunities.

These beaches are composed of silt or clay which are normally unsuited to swimming but offer opportunity for beach-combing, nature observation, viewing or related activities.

B2 - Sand Beach

Beaches of sand composition, possibly with intermixing of pebbles and pea-gravels, which have slopes that are generally under 5%.

Plate 43. A gently sloping sand beach in the Okanagan Valley. The warm lake water during the summer and the extensive area of useable beach makes this area highly significant (B^2f + +).

B3 - Pebble Beach

Beaches composed of rounded pebbles and small gravels, approximately 2 mm to 64 mm in size, with little intermixing of sand.

See Plate 44 on page 23.

B4 - Cobble Beach

Beaches composed of materials which are mainly rounded gravels and cobbles between 64 and 256 mm in diameter. The gradient of these beaches are slightly greater, often in the range of 5-10%.

See Plate 45 on page 23.

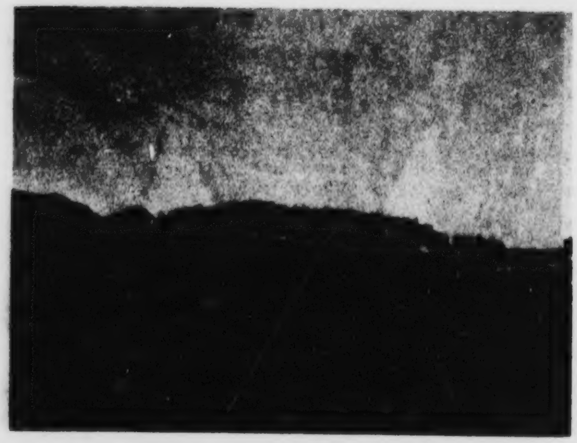


Plate 44. A pebble beach in Sea Otter Cove on Northern Vancouver Island. It has a very gentle gradient, is completely covered at high tide and poorly drained in sections at low tide. However, it does offer opportunities for viewing and beachcombing (B^4V-).

Plate 45. A sand and cobble beach on the west coast of Vancouver Island. This beach, which is accessed from the West Coast Trail provides opportunity for viewing and beachcombing and occasionally, sunbathing ($B^{2.4}V+$).

B5 - Rubble Beach

Beaches composed of rough or angular rocks and boulders which are often underlain and separated by sand to cobble sized material.

Plate 46. Rubble beach on Sydney Island. The rubble material which overlies sand, the fact that much of the beach is under water at high tide, and the difficult access from the upland limit the significance of this unit ($B^{5.2}V-$).

B6 - Beach - Texture Unknown

Identified beaches of unknown texture. This symbol will be used when the unit has not been field checked and the mapper is aware of its occurrence but is unsure of the texture of the beach material.

D. Hydrologic Features

Non-biotic water features including waves, rip tides, currents, unique water colour and junctions of major rivers. Examples include the junction of the Fraser and Thompson Rivers, waves at Long Beach and the water colour of Kalamalka Lake.

Factors which should be considered in rating the significance of these features include size, and the length of the day or season(s) during which the feature can be observed.

See Plate 36 on page 20.

F. Waterfalls and Rapids

There are three waterfall and rapid sub-feature categories described.

Factors which should be considered in rating the significance of these sub-features include:

setting (appeal of surrounding area included in the unit); height, width and time of flow (spring only, spring through fall, year round); type of flow (even, turbulent, single drop or cascade).

F1 - Site-Specific Waterfall

Waterfalls or series of waterfalls along one waterway, with opportunities for close viewing.

Plate 47. A single waterfall in the Fraser Canyon. Due to its height and volume this falls is of moderate significance (F^1 +).

F2 - Waterfall Landscape

Valleys and landscapes where numerous and usually high elevation waterfalls can be, or have the potential to be, observed from a great distance. Use of this feature symbol over extensive areas will indicate that numerous waterfalls are found within the unit.

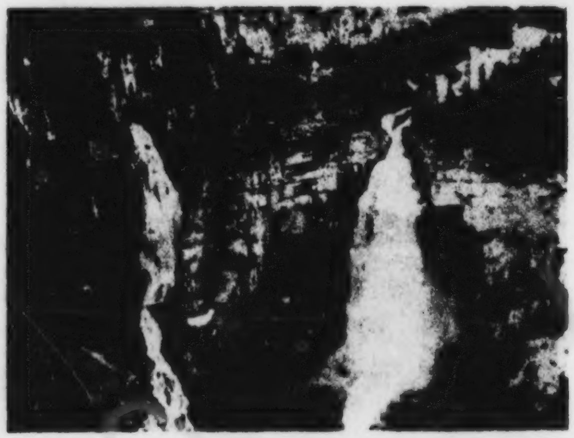


Plate 48. A spectacular series of waterfalls cascading over a sedimentary rock scarp in the northern Rocky Mountains, a sub-feature of high significance. The falls on the left emerges from a subsurface stream flowing through the limestone bedrock (F^2R^2 + +).

F3 - Rapids and Chutes

Rapids or sets of rapids which have significant viewing potential.

Plate 49. A small creek in the West Kootenays which exhibits a series of rapids and chutes. It provides landscape diversity and is of low significance (MF^3 −).

J. Coastal Features

Coastal features resulting from active wave, current and other water associated processes which can be differentiated by their form and method of development. Nine sub-feature categories are recognized. Sub-feature categories J6-9 (Spits, Points, Tombolos, Pocket Beaches) can also be described as beaches. However, each has a distinct form which adds to their interpretive value. In addition, some of these sub-features often have an association with, or are one of the reasons for, the development of estuaries (J1) tidal marshes (J2) and lagoons (J3).

Following is a brief description of the nine sub-feature categories which have been recognized.

J1 - Estuary

Areas where coastal accretion has resulted in a semi-enclosed body of water which has a free connection to the open sea and within which the sea water is measurably diluted with freshwater from the adjacent land (Smith, 1969).

See Plate 17 on page 13.

J2 - Tidal Marsh

Coastal wetlands composed of aquatic and semi-aquatic vegetation rooted in poorly-drained, poorly aerated soil occurring from mean low water inland to the line of non-aquatic vegetation. They are able to support salt tolerant vegetation due to the deposition of tidal silt and to the protection which is provided from violent wave action. Tidal currents maintain their flow through the marsh by means of a network of tidal streams.

J3 - Lagoon

An elongated body of water lying parallel to the coastline which is separated from the open sea by a barrier. The quiet water behind the barrier usually receives significant amounts of stream-contributed sediments. The inlet to the lagoon is usually kept open by tidal action.

See Plate 52 on page 26.

J4 - Tidal Flat

Low gradient intertidal areas which do not support significant vascular plant vegetation. They are composed of silt and clay surficial materials and often support diverse assemblages of invertebrates and algae. With increased growth of salt-tolerant plants and sediment accumulation the tidal flat may become a tidal marsh.

Plate 50. Tidal marsh in Goldstream Park, Vancouver Island at the upper end of Goldstream estuary. An area of moderate significance with vegetation and wildlife diversity offering excellent opportunities for nature interpretation (J^2E^8V+).

Plate 51. A tidal flat at low tide north of Ucluelet. It provides opportunity for clam digging, nature interpretation (viewing crabs and other marine organisms) and is of low significance (J^4A^2-).

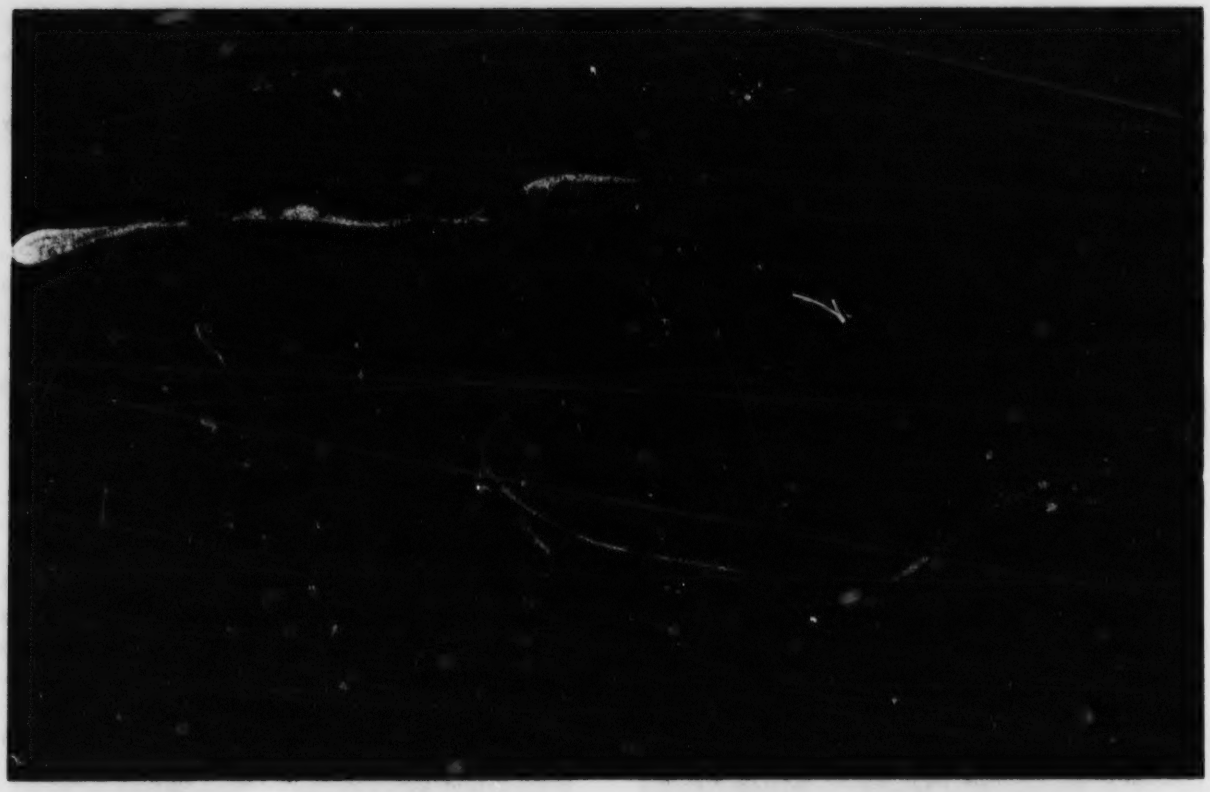


Plate 52. An aerial photograph of Sidney Spit Marine Park on Sidney Island. The lagoon in the centre and the spit in the upper left are excellent examples of these two coastal sub-features. The sandy beach as well as the lagoon which supports a diversity of marine species provides beachcombing and related opportunities and is of high significance ($J^{3.6}B^{2}$ + +).

J5 - Rock Platforms and Ledges

Intertidal and sub-tidal rock platforms and ledges which may contain tidal pools and are often rich in sea life. They may also be identified along freshwater lakes.

If the rock shoreline restricts foot access from the water to above the foreshore (i.e. it is steep and over approximately 6 feet in height) it should be described using the sub-feature R1 (Bedrock Exposure). Such exposures fronting on the ocean or lakes will often be associated with little or no foreshore area.

Plate 53. A gently sloping rock platform on the Hesquiat Peninsula, Vancouver Island. This is an excellent example of this type of sub-feature and may be considered of moderate significance ($J^{5}VA^{2}$ +).

J6 - Spit and Hook

A narrow beach deposit, extending out into open water. Wave action may cause sediment to be carried out around the spit end resulting in the development of a hook.

See Plate 52 on page 26.

J7 - Point

Triangular shaped shoreline projections from the shore of a lake or sea. They may be the remnants of an eroded bluff.

Plate 54. A small sandy point on the east side of Valdes Island. The area above the foreshore is well suited to viewing, picnicking and dispersed camping while the sand and pebble beach provides sunbathing opportunities. This is an area of moderate significance ($J^7B^{2-3}Vk+$).

J8 - Tombolo

One or more sand spits which connect an island to the mainland. Where a double tombolo occurs a lagoon is formed between the two. The lagoon will gradually become filled with sediment.

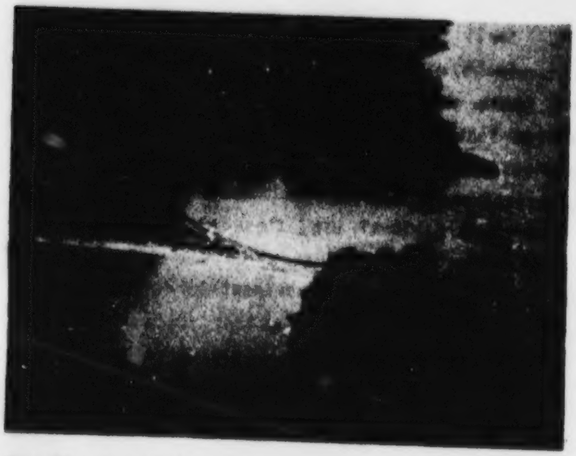


Plate 55. A tombolo connecting the south end of Galiano Island to a small rock islet. Its location adjacent to Porlier Pass, the sandy beach and well drained vegetated shoreland between the beaches provide excellent opportunities for sunbathing, viewing, picnicking and camping. This is a classic example in an attractive setting of this type of sub-feature. It is of high significance (J^8VB^2++).

J9 - Pocket Beach

Beaches which have developed in isolation. They may have developed at the head of a bay as the result of material carried from a promintory or they may develop in-situ. Typically these beaches are composed of coarse sediment.

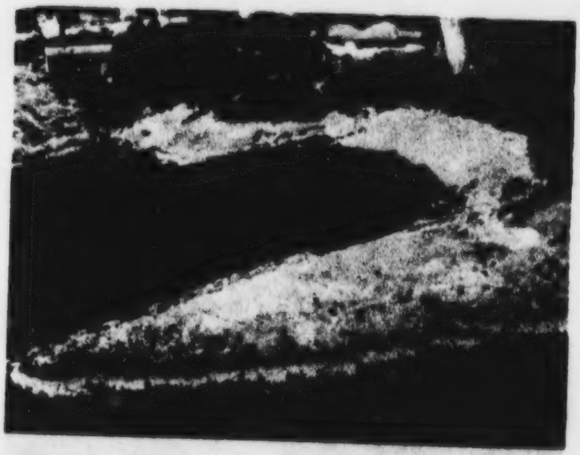


Plate 56. A good example of a pocket beach on the Saanich Peninsula which has formed through erosion of the headland and deposition in the bay. This small sheltered beach offers sunbathing and viewing opportunities and is of low significance (J^9B^3V-).

M. Small Surface Waters

Small water bodies (usually under 60 ha) such as tarns, ponds and sloughs, small lakes and small streams which add to landscape character and composition and thereby increase the scenic attractiveness of the landscape. Often of little direct recreational use, these waterbodies may not warrant feature modifiers which describe associated activity opportunities (see section 2.4).

N. Large Surface Waters

Medium to large lakes (as a general rule larger than 60 ha) and rivers which add significantly to the viewing variety and recreational attractiveness of a landscape. A number of feature modifiers describing suitable activity opportunities, (i.e., angling, boating) will usually apply to this feature category (see section 2.4).

Plate 57. A small shallow lake in the Rocky Mountain Trench which offers opportunities for viewing and nature observation. Lakes such as this are very common in the region. The fine textured bottom, shallow water and aquatic weeds are not suited to water oriented activities. This unit is of low significance (MVW^5 –).

Plate 59. A section of the Peace River which is of high significance providing opportunity for river boating, canoeing, fishing and riverside camping (NbcA^{1}aB^{2,3}k+ +).

Plate 58. A small creek along the south side of Fairy Lake in the northern Rocky Mountains. It provides landscape diversity and is of low significance (MF^3 –).

Plate 60. Columbia Lake in the Rocky Mountain Trench. Overall this area is of high significance offering excellent viewing opportunities due to its interesting diverse landscape.

T. Springs

Upwellings of groundwater. There are three sub-feature categories recognized.

T1 - Thermal Springs

Springs which have a water temperature of over 5°C or 10°F above the mean annual air temperature of the surrounding region. Warm springs are those thermal springs which have a temperature below 30°C or 90°F and hot springs are those thermal springs above 30°C.

Factors which should be considered in rating the significance of this sub-feature include: the relative scarcity of thermal springs (there are in the vicinity of 70 in all of Canada); whether they have sufficient flow and temperature to be suitable for bathing (if they do they will likely be of provincial significance); whether they have unusual chemistry or colourful mineral deposits; setting; presence of unique plants or the occurrence of plant and animal species not commonly found in the area (for example Hot Springs Panicum found at Fairmont Hot Springs). Depreciating factors include unpleasant odour, low flow, corrosive chemicals and poor setting (some hot springs on the coast are below high tide level).

Plate 61. Lussier Hot Springs, an undeveloped springs adjacent to the Lussier River near Whiteswan Lake in the East Kootenay. There are several pools which range from hot to warm. It has park reserve status and is of high significance ($T^1 + +$).

T2 - Freshwater Springs

Are mostly cold springs with a water temperature less than 5°C or 10°F above the mean annual air temperature of the surrounding area. They may be close to ambient air temperature if the water has been underground a short time and/or has experienced solar heating.

Factors which should be considered in rating this sub-feature include: flow volume, setting, suitability to bathing and, in dry areas, effect of spring on surrounding plant community.

Plate 62. A cold (2.4°C) freshwater spring on the south side of Fairy Creek in the northern Rocky Mountains ($T^2 -$).

T3 - Mineral Springs

Springs which have a substantially different water chemistry from nearby surface waters, and which are often associated with mineral deposits from very heavily mineralized and gas-laden water. These deposits may be tufa or travertine as in the case of the Ospika Cones (upper Ospika River) salt, as in the case of the Fernwood Springs (Saltspring Island) red ochre, as in the case of the Paint Pots (Kootenay National Park), or other minerals, such as psilomelane, pyrolusite, soda, potash and gypsum.

Factors which should be considered in rating the significance of this sub-feature include: the relative scarcity of mineral springs (there are fewer good mineral springs in B.C. than thermal springs) the quantity, colour, form and minerology of the deposit; and, the setting and ecological impact of the spring on the area.

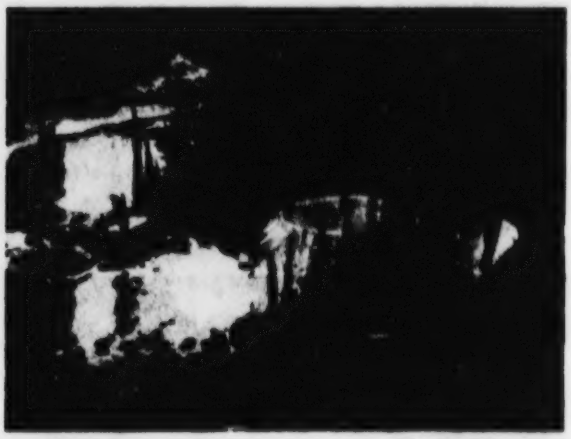


Plate 63. Mineral springs and cone formations on the Ospika River on the east side of Williston Lake. The numerous springs, unique mineral formations and attractive water colour make this a unit of very high significance (T³D).*

U. Harbour

Protected bays or water with potential for boat moorage, launching or harbour-marine facilities.

Plate 64. Prideaux Haven in Desolation Sound Marine Park, the centre of one of the most outstanding areas for coastal cruising on the west coast of North America (UV).*

Factors to be considered in rating the significance of this feature include: size, water depth, substrate materials, ease of access and egress and relationship to direction of prevailing winds.

2.3.4 Cultural/Historic Feature Group

H. Native Indian

Archaeologic and historic sites and routes associated with native Indian culture which provide important outdoor recreation opportunities. Four sub-feature categories are recognized.

H1 - Archaeologic Sites

Middens and old villages featuring evidence of habitation, artifacts, old structures, totem poles, kikwillee holes, etc.

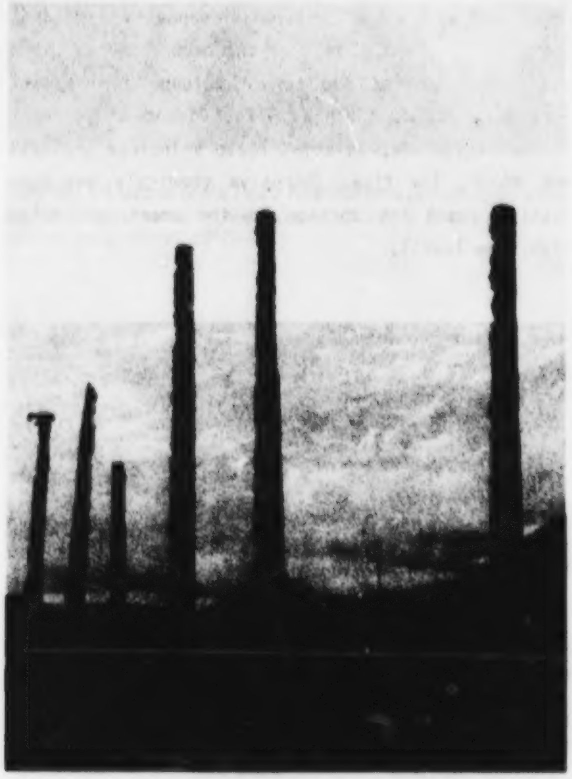


Plate 65. Kitwanga near Hazelton. This interior village is one of the last areas in B.C where the totem pole art form is so evident. It is a site of high significance (H¹ + +).

H2 - Pictograph - Petroglyph Sites

Areas featuring pictographs (rock paintings and drawings) or petroglyphs (rock carvings or markings).

Plate 66. Petroglyphs carved into a large boulder on the Stikine River near Telegraph Creek. This is a major type of Indian art form which is found throughout the Province. Because of its profile this particular example is of high significance (H^2 + +).

H3 - Archaeologic Routes

Corridors which were once important routes for Indian movement and trade such as the grease trails.

See Plate 67.

H4 - Legend Sites

Areas prominent in Indian religion or lore. They may provide little or no physical evidence of their presence.

I. European/Pioneer

Sites and routes related to early European exploration and pioneer history which provide important outdoor recreation opportunities. Three sub-feature categories are recognized.

I1 - Historic Sites

Areas related to early exploration, settlement and pioneering. Certain geographic units may be considered historically significant because they are the location of past events. Other units will be considered historically significant because of the occurrence of original structures or reconstructions. *See Plate 68 on page 32.*

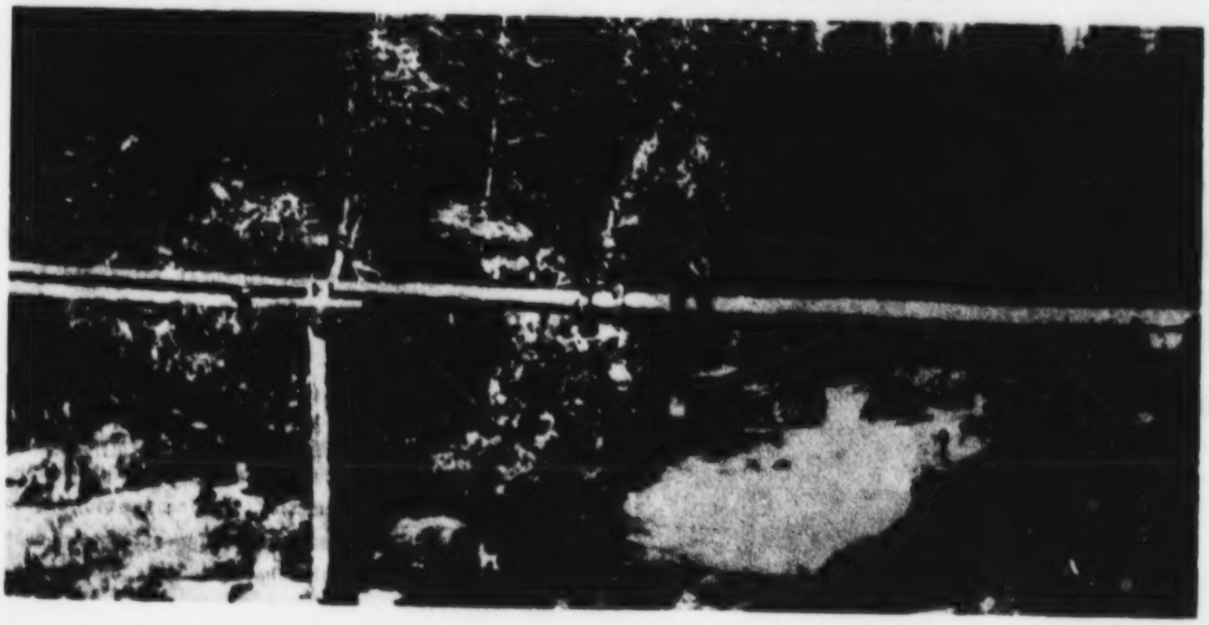


Plate 67. Archives photograph of a bridge that crossed the Kispiox River at Git-an-Gwalq and was part of the grease trail that extended from the Nasco River to the Kuldo River. Only a few remnants of this bridge remain. This route is of high significance since it is one of a small number of known grease trails in the province (H^3 + +).

Plate 68. Fort Steele Provincial Park, a historic site that focuses on the gold rush boom which occurred at the turn of the century in the East Kootenay. Its historic significance combined with the interpretative facilities provided by the Parks and Outdoor Recreation Division make it of very high significance ($I^1 P^{4*}$).

I2 - Monuments

Plate 69. This monument commemorates the founding of Fort Saint James by Simon Fraser in 1806 for the Northwest Co. Five of the original buildings dating from 1884–1889 still remain at the site which is of very high significance ($I^{1.2*}$).

This sub-feature category includes modern markers, plaques and monuments which identify sites and areas that are historically and culturally important.

I3 - Historic Routes

Trails, roads and routes which played a role in early European/pioneer development in B.C.

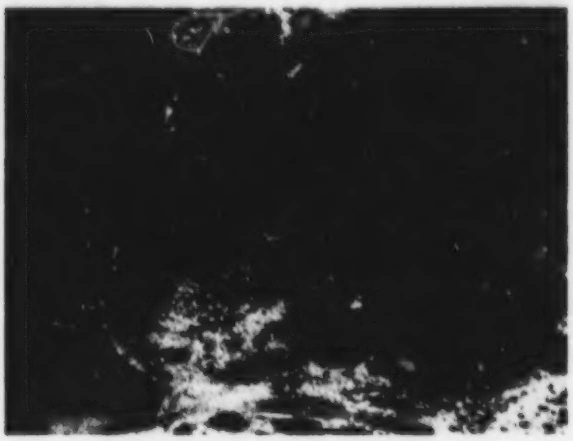


Plate 70. A portion of the Yukon telegraph trail that is still clearly evident. This trail was started in 1899 at Fort Stager north of Kispiox and was completed in 1902 at Dawson City. It was established in order to maintain communications with the prospering Klondike gold fields and was used to some extent as an access route to the north. Portions of the trail were used until the 1930's and old line cabins and remnants of the line still remain. This route is of high significance ($I^3 + +$).

P. Cultural

Modern or present day cultural sites and land use patterns which provide outdoor recreation opportunities. Four sub-feature categories are recognized.

P1 - Cultural Sites

Villages or centres of unique or interesting cultural activities such as trading posts, Indian villages, ethnic centres and fishing villages. Such sites may or may not also have historic or archaeologic significance.

Plate 71. Church at St. Eugene's Mission near Cranbrook. A cultural site that is also of historic significance. It is an attractive building of high significance within a pastoral landscape ($P^{1,2}I^{1}V$ + +).

P2 - Pastoral Landscape

Settlement and land use patterns such as farmlands which add diversity and interest to a natural landscape and usually provide increased viewing potential.

See Plate 72.

P3 - Vacant Land

Areas in or adajacent to urban locations which are neither built up nor have natural vegetation, including vacant lots, playgrounds, golf courses and boulevards. Such areas may be significant open spaces or "greenbelts".

Plate 72. Farmland in the Rocky Mountain Trench which adds an interesting diversity to the landscape and presents excellent viewing opportunities. Such areas are of moderate significance ($P^{2}V$ +).

P4 - Man-made

Areas exhibiting major, permanent, mainly non-urban man-made structures of recreational interest including hydro-electric dams, quarries and mines, airports, harbours and bridges.

Plate 73. This bridge which crosses the Bulkley River at Hagwilgate is an example of a man-made structure which adds, in a positive way, to the diversity of the landscape. The structure also provides added opportunity to view the river canyon it crosses ($NL^{4}P^{4}$ +).

2.3.5 Miscellaneous Feature Group - X

A unit can be denoted by this feature symbol to represent an area or site with a recreation feature which is not adequately defined by one of the other features or sub-features; an annotation symbol would normally be used in conjunction with use of the miscellaneous feature.

2.4 Recreation Feature Modifiers

Recreation feature modifiers can be used to further describe the physical character of a feature. They are not necessarily used to indicate that a recreation activity is taking place in a unit but that the potential for a specific activity has been judged to exist as a result of assessing the recreation features which are present. Following are examples of some of the recreation feature modifiers which can be used (also see section 5.1.2).

a. Angling - areas offering significant opportunities for sport fishing. In addition to factors considered in rating the sport fish sub-feature category (A^1), such factors as depth of water, pattern of water and accessibility of water from shoreline, stream bank or river bank are considered.

Plate 74. Fishing in a canyon section of the Adams River. This is an excellent area for angling as well as for viewing the major migrations of spawning salmon supported by the river. It is of high significance ($A^{1.3}aVL^8 + +$).

b. Specialized Boating - waterways with potential to offer "white water" canoeing, rafting and specialized boating opportunities.

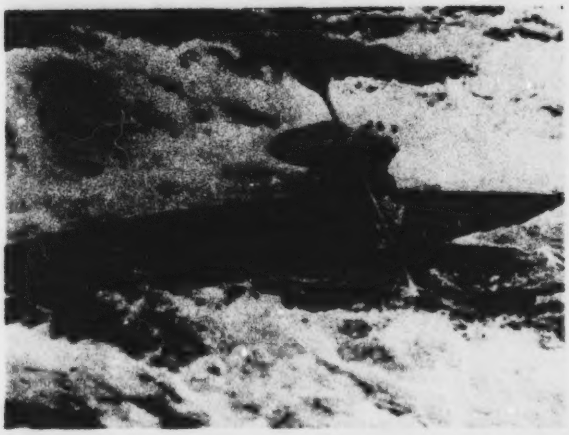


Plate 75. A kayaker on the Capilano River in the lower mainland. This river provides high quality kayaking opportunities ($NbF^3 + +$).

c. Canoeing - water suitable for non-specialist canoeing and open boats. Examples include continuous routes along relatively slow moving streams, rivers or lake chains as well as protected larger water bodies or interesting small lakes. This feature modifier will also indicate areas safe for other small open boats such as rafts and row boats.

d. Deep Water Swimming - deep water suitable for swimming areas where such factors as water temperature; water quality and the presence of currents or undertow should be considered. *See Plate 76 on page 35.*

f. Family Bathing - areas with water and lake or river bottom conditions which are suitable for family bathing. Such factors as water temperature, water depth, the presence of currents or undertow, water quality and bottom texture and conditions should be considered. *See Plate 77 on page 35.*

Plate 76. Premier Lake in the East Kootenay. This section of the lake with the abutting bedrock point is ideally suited and used for diving and deep water swimming; it is of moderate significance (NdV+).

Plate 77. Sandy beach with a moderate gradient well suited to family bathing: Bear Lake Provincial Park near Prince George. This is a beach of very high quality for this area of the province and is of high significance (MB^2fV++).

k. Recreation Development Potential - areas adjacent to or associated with significant shoreline, riverside or upland recreation features which appear suited to organized camping, cottaging or other similar development.

Plate 78. South end of Rockbluff Lake in the East Kootenay. This area with its mixed vegetation offers opportunities for camping, picnicking and viewing and is of moderate significance (E^4kV+).

l. Dispersed Camping - areas of gently sloping to level terrain in an otherwise moderately to steeply sloping, often forested, landscape which appears suited to dispersed camping. For both feature modifiers k and l, such factors as proximity to significant recreation opportunities, slope of the terrain, vegetation cover, and drainage should be considered.

m. Developed Trail (location unknown) - used when a trail is known to occur within a unit but its actual location is not known accurately enough to be indicated on a map.

n. Developed Trail - used when the location of an existing recreational trail is known. An on-site symbol will usually indicate the location of the trail (see section 2.5.1) *and Plate 79 on page 36.*

Plate 79. Cobb Lake trail in Kootenay National Park within an area of moderate significance. Depending on the scale of the mapping it may be possible to indicate the specific location of the trail on the features map using the on site symbol —X—X as well as the map unit symbol Q^2nVr+.

s. Winter Recreation (general) - usually extensive areas which provide opportunity for cross-country skiing, snowshoeing, snowmobiling, tobogganing and downhill skiing. Such factors as average amount and length of snow cover, as well as topographic, vegetative and climatic conditions will have to be considered. If the necessary information is available this category may be subdivided for the specific activities.

Plate 80. With suitable snow conditions, the topography and vegetation patterns of this area near Apex Alpine in the Okanagan provides suitable conditions for several types of winter recreation activities including downhill skiing, cross country skiing, snowshoeing and snowmobiling (E^1sV+).

Other Feature Modifiers

A number of other feature modifiers have been employed in recreation features inventory projects, particularly those of the Ministry of Forests. Some of these modifiers include: beach activities, boat launching, climbing, four-wheel driving, glacier experience, horseback riding, hiking, gathering and collecting, motorcycle riding, scuba diving, hunting, caving, summer recreation (general), snowmobiling, power boating, viewing, wildlife viewing, orienteering and sailing. If the necessary information is available and the objectives of the inventory project warrant, these and other feature modifiers can be employed.

2.5 Mapping Conventions

A number of mapping conventions have been adopted in the recreation features inventory system. They are meant to both standardize the format of map symbolization, and provide considerable flexibility in the detail of the information which may be presented for each recreation feature map unit. These units can be defined as areas of land or water which exhibit a discrete combination of natural elements (rock, soil, vegetation, water etc.) which, from an inventory point of view have a uniform attractivity in relation to the feature or features found therein.

2.5.1 On-Site Symbols

1. Point data such as historic sites can be recorded by a small circle, preferably not smaller than 4 mm in diameter.
2. Those trails or corridors which are too limited in aerial extent to be expressed by a map unit (due to map scale) can be indicated by a linear symbol.
   Two sub-features which have been expressed by linear on-site symbols are historic (-▲▲▲-) and archaeologic (-⊖⊖⊖-) routes. In addition, existing recreational trails can also be indicated by an on-site symbol (-✱✱✱-).
3. A recreation activities symbol ⓡ can be used when a specific recreation activity is known to occur within a particular area.
4. Residential, commercial and industrial areas are not usually mapped. The symbol '8' can be used to delineate these areas.

2.5.2 Features, Sub-Features and Feature Modifiers

1. For any land or water unit, recreation features are seldom found in isolation, but rather are grouped into an association. A maximum of three feature symbols can be indicated for each unit.
2. A maximum of two sub-feature categories can be indicated for each feature symbol. These sub-feature categories are indicated as superscripts to the feature symbol.
3. Up to two feature modifiers can also accompany each feature symbol to describe further the physical character of that feature.

2.5.3 Annotations

A numerical annotation may accompany a feature or set of features in a given unit in order to indicate that additional written information is available on the feature(s) within that unit. This annotation will often be used where unusual or unique features occur. Examples include the occurrence of unique plant species, areas where edible plants are concentrated, and areas supporting unique wildlife populations such as the Vancouver Island marmot. This information can be included in a narrative attached to a map, or provided in a report associated with a number of maps for a study area, or it may be retained in the office of the agency responsible for the inventory. Parentheses should be used to separate the annotation number from the other symbols.

2.5.4 Feature Significance Rating

Each unit must be given at least one feature significance rating. In certain circumstances, where two or more features which exhibit considerably different feature significance values occur within a unit, two feature significance ratings can be given. In this case, each rating should follow the symbol with which it is associated.

Table 1. Outdoor recreation features and feature modifier legend.

FEATURE GROUP	FEATURE	SYMBOL	SUB-FEATURE
BIOTIC	Aquatic	A1	Sport Fish
		A2	Aquatic Habitat
		A3	Fish Run Observation
		A4	Aquatic Foods
	Vegetation	E1	Alpine - High Subalpine
		E2	Transitional
		E3	Coniferous
		E4	Deciduous (Broadleaf)
		E5	Mixed
		E6	Parkland
		E7	Non-forested
		E8	Wetland
	Wildlife	W1	Upland and Aquatic birds
		W2	Small mammals
		W3	Large mammals (Land)
		W4	Marine mammals
		W5	Wildlife Diversity
PHYSICAL GEOGRAPHIC	Glaciers and Icefields	G1	Glacier
		G2	Icefield
	Landforms	L1	Glacial Ice Melting
		L2	Glacial Ice Movement
		L3	Periglacial
		L4	Moraine Ridges and Cirques
		L5	Karst
		L6	Avalanche Tracks, Talus and Scree
		L7	Landslides
		L8	Canyons, Escarpments and Hoodoos
		L9	River and Stream Deposits
		L10	Windblown Deposits
		L11	Shoreline Erosion, Raised Beaches
	Topographic	Q1	Regional Topographic Patterns
		Q2	Local Topographic Patterns
		Q3	Shorelands
	Rock	R1	Bedrock Exposure
		R2	Internal Structural Rock Exposures
		R3	Mineral Deposits
		R4	Fossils
		R5	Volcanic
	Viewing Site	V	Viewing

FEATURE GROUP	FEATURE	SYMBOL	SUB-FEATURE
WATER ORIENTED	Beaches	B1	Fine Textured Beach
		B2	Sand Beach
		B3	Pebble Beach
		B4	Cobble Beach
		B5	Rubble Beach
		B6	Beach - Texture Unknown
	Hydrologic	D	Hydrologic
	Waterfalls and Rapids	F1	Site-Specific Waterfall
		F2	Waterfall Landscape
		F3	Rapids and Chutes
	Coastal	J1	Estuary
		J2	Tidal Marsh
		J3	Lagoon
		J4	Tidal Flat
		J5	Rock Platform and Ledges
		J6	Spit and Hook
		J7	Point
		J8	Tombolo
		J9	Pocket Beach
	Small Surface Waters	M	Small Surface Waters
	Large Surface Waters	N	Large Surface Waters
	Springs	T1	Thermal Springs
		T2	Freshwater Springs
		T3	Mineral Springs
	Harbour	U	Harbour
CULTURAL/ HISTORIC	Native Indian	H1	Archaeological Sites
		H2	Pictograph - Petroglyph sites
		H3	Archaeologic Routes
		H4	Legend Sites
	European/Pioneer	I1	Historic Sites
		I2	Monuments
		I3	Historic Routes
	Cultural	P1	Cultural Sites
		P2	Pastoral Landscape
		P3	Vacant Land
		P4	Man-made
MISCELLANEOUS	Miscellaneous	X	Miscellaneous

FEATURE MODIFIER	
a	Angling
b	Specialist Boating
c	Canoeing
d	Deep Water Swimming
f	Family Bathing
k	Recreation Development Potential
l	Dispersed Camping
m	Developed Trail (location unknown)
n	Developed Trail
s	Winter Recreation

ON-SITE SYMBOLS	
historic route	—▲—▲—▲—▲—
archaeological route	—O—O—O—O—
recreation activity	ⓡ
built-up areas	B
known trail location	—✕✕✕✕✕—

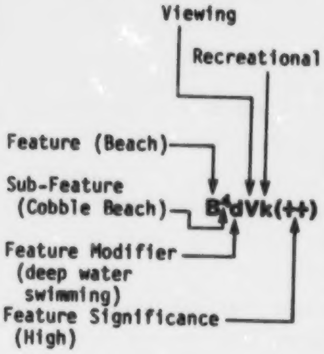
2.5.5 Example Map Symbolization

Each recreation feature unit may be assigned up to six separate types of symbols: Feature Symbol; Sub-Feature Category; Feature Modifier; Feature Significance; Recreation Activity Symbol; and Feature Annotation.

Single Feature

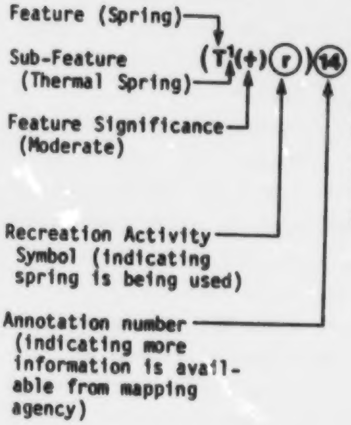
E^{1*} - a unit of alpine - high subalpine vegetation of very high significance.

Multiple Feature


Viewing
Recreational Development Potential
Feature (Beach)
Sub-Feature (Cobble Beach)
$B^4_3dVk(++)$
Feature Modifier (deep water swimming)
Feature Significance (High)

a unit with a cobble beach fronting water opportunities for deep water swimming accompanied by significant viewing opportunities and potential for campsite development.

Use of Annotation


Feature (Spring)
Sub-Feature (Thermal Spring)
$(T^1(+)$ ⓡ $)$⑭
Feature Significance (Moderate)
Recreation Activity Symbol (indicating spring is being used)
Annotation number (indicating more information is available from mapping agency)

a thermal spring of moderate significance that is actively being used. More detailed information has been recorded under reference number 14 for that particular map sheet

2.5.6 Areas of Very Low Feature Significance

Within a study area, there may be large areas which are assessed as having low or very low feature significance. In the judgement of the agency or individual carrying out the inventory, it may be of little value to subdivide these areas into units and identify recreation features, sub-features and feature modifiers. In this situation, such areas may be left as large units with only the appropriate significance rating (either - or =) indicated in each case. Alternatively, it may also be worthwhile to indicate one or two sub-features as landscape descriptors to provide an indication of the character of the unit.

2.5.7 Map Legend

A legend describing all the symbols which have been used on a map sheet should be permanently attached to its right-hand margin. This will make the map a more complete product, and will also allow the mapper to identify any conventions which have been used which are unique to that map sheet. The date of the inventory and the name of the agency which produced the map should be provided as part of the legend. (An example 1:50 000 scale map legend is provided at the back of this manual).

2.5.8 Mapping Scales

The recreation features inventory system is designed so that it can be adapted to a variety of map scales and inventory detail. The following section describes the mapping formats which can be used for map scales ranging from larger than 1:10 000 to as small as 1:500 000. It is assumed in the discussion that the detail of the information which is to be mapped is the major factor in determining the map scale to be used. The descriptions given for each map scale (e.g. 1:100 000) will pertain to a range of scales (e.g. 1:100 000 would also include 1:125 000).

1:10 000

When map scales of 1:10 000 and larger are used, detailed information should be available for a majority of the map units. In this case, each unit can be given a number with a written description provided for each unit (or type of unit) in a map narrative or report format. This number may appear only once on a map for a study area, or it may be repeated if two or more units occur that have similar biophysical and related recreation characteristics. In addition to the number, the recreation feature significance of the unit can be indicated on the map.

If detailed surficial geology and vegetation units have also been mapped, these map units should be used where possible, for the recreation feature unit boundaries. This allows direct, accurate, detailed interpretation of biophysical information for outdoor recreation significance and opportunities. Following this background discussion, such factors as existing use and potential opportunities may be reviewed.

1:20 000

At this scale, all map symbols (feature, sub-feature etc.) can be used. It is likely that, for many map units, more detailed information than can be described by the map symbols would be available. Annotation symbols should therefore be used extensively (see section 2.5.3).

A map narrative or a report accompanying the maps and providing detailed supporting written information would also usually be provided. If the study area is small enough it may be possible to provide detailed written descriptions in the attached map narrative of recurring map unit symbol combinations.

1:50 000

At the 1:50 000 scale, all of the types of map symbols can still be used. However, as this map scale is most commonly adopted for a reconnaissance level of inventory, the use of the annotation symbol and map narrative specifically tailored for each map would be less frequent (see Figure 1).

The production of a report to accompany the maps would be appropriate if a number of maps are produced for a single study area.

1:100 000

At this scale, depending on the complexity of the landscape, all the various types of map symbols can be used. As with the 1:50 000-scale inventory, the annotation symbol would be used infrequently. It may also be desirable to omit the sub-feature and feature modifier categories. For example, rather than using B^4d (cobble beach which fronts on an area suitable for deep water swimming), B (beach) could be used (see Figure 2).

A report accompanying the maps would be the most common means of providing supporting written information.

1:250 000

When this broad scale of mapping is the most detailed that is produced for an area, a format similar to that described for 1:100 000 mapping, with the omission of sub-features and feature modifiers, can be used.

However, more commonly this map scale will be used to provide a general overview, perhaps in a report, of an area also mapped in more detail. For this purpose, the use of feature symbols can be dropped in favour of using the broad feature group descriptions (see Table 1). These feature groups are as follows: Biotic Features (indicated on the map by the numeral 1); Physical Geographic Features (2); Water Oriented Features (3); and Cultural Historic Features (4). In addition, in such an overview, it may be necessary to use a three class rating system of high ($^{++}$), medium (+) and low (-) for feature significance rather than the five levels of feature significance described in section 2.2. As an example of such generalization of more detailed mapping, two adjacent units may have been described as $A^1W^6B^1(^{++})$ and $W^5E^8M(^{++})$ on a 1:50 000 map. These units would be described as 1^{++} (Biotic Feature Group) at the 1:250 000 overview level (see Figure 3).

As part of this summarization, it may not be possible to identify small units of moderate to low significance which differ in character from surrounding more significant units. In addition small units which are of high or very high significance and are surrounded by units of lower significance may require identification as site specific features. Units which have very low significance (=) on the detailed map can be left unmapped at the 1:250 000 level.

Often the 1:250 000 recreation features map will be used for summary purposes in a report. When it is a stand alone map, it will usually be worthwhile to attach an overview narrative to the map margin.

1:500 000

The 1:500 000 map will be used exclusively to summarize information which has been mapped in more detail at a larger scale. At the 1:500 000 scale, none of the standard map symbols are used. Instead, the map units are broken down into 3 major categories: 1) site-specific recreational features (such as waterfalls, historic sites etc.); 2) upland units (such as areas of interesting or unique vegetation, rock features etc.); and 3) shorezone and water units. The areas identified as containing these features should be of very high, high or moderate significance as described in section 2.2. The areas of low and very low significance are left unmapped (see Figure 4).

Most often, maps of this scale will be provided in a report for an area in which a recreation inventory has taken place.

1:50 000 - 1:500 000

In summary, a review of Figures 1 to 4 will graphically illustrate the information detail which can be provided at each map scale. In carrying out this comparison of scales it should be noted that the feature typing in Figures 1 to 3 and that shown in the box in Figure 4 is for the same area.

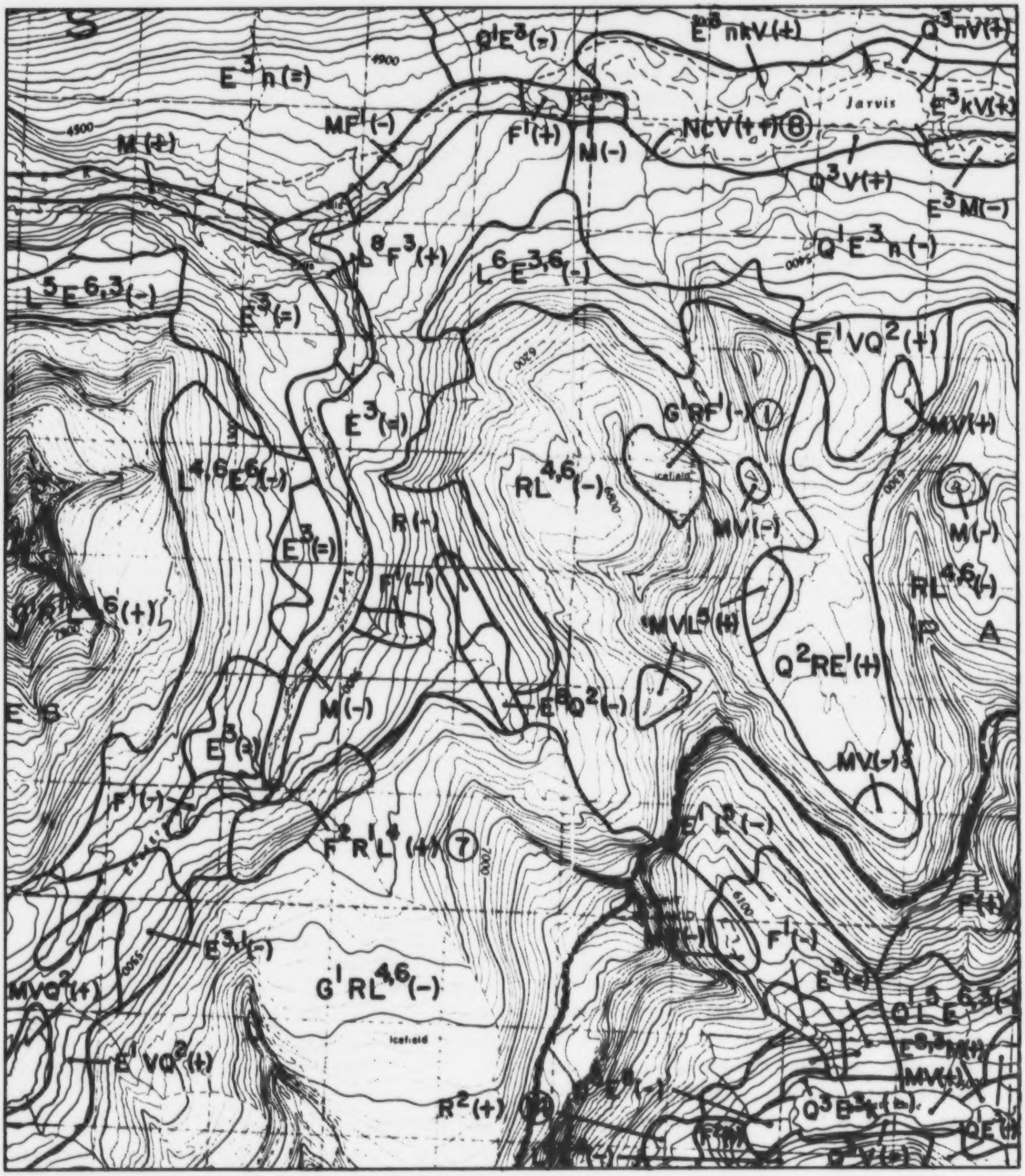

S
E3n(=)
Q1E3(=)
E3nkV(+)
Q3nV(+)
Jarvis
E3kV(+)
MF1(-)
M(+)
F1(+)
M(-)
NcV(+,+) ⑧
Q3V(+)
E3M(-)
L8F3(+)
L6E3,6(-)
Q1E3n(-)
L5E6,3(-)
E3(=)
E1VQ2(+)
E3(=)
G1RF1(-) ①
MV(+)
L4,6E6(-)
RL4,6(-)
Icefield
MV(-)
M(-)
E3(=)
R(-)
RL4,6(-)
F1(-)
MVL5(+)
P A
G1R1L4,6(+)
Q2RE1(+)
E8Q2(-)
M(-)
E 8
E3(=)
MV(-)
F1(-)
E1L5(-)
F2R1L4(+) ⑦
F1(+)
F1(-)
E3,1(-)
E3(=)
MVQ2(+)
G1RL4,6(-)
Q1L5E6,3(+)
E8,3M(+)
Icefield
MV(+)
E1VQ2(+)
R2(+)
Q3E3
QE(+)
4900
4500
6200
6000
7000
6100
5500

Figure 1. 1:50 000 Outdoor recreation features map

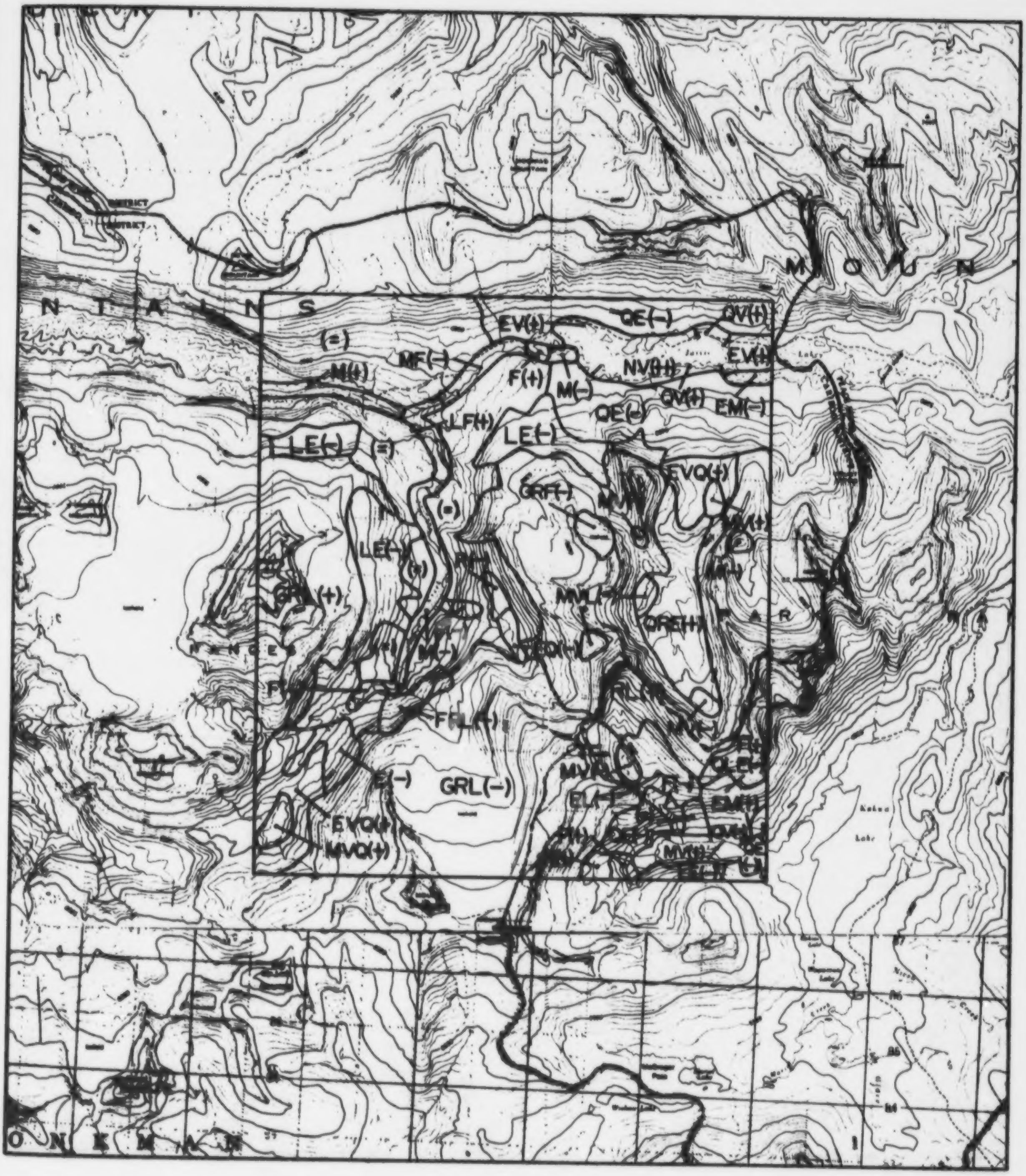

N T A I N S
M O U N
EV(+)
QE(–)
QV(+)
(=)
MF(–)
M(+)
F(+)
M(–)
NV(+)
EV(+)
QV(+)
QE(–)
EM(–)
LF(+)
LE(–)
LE(–)
(=)
EVQ(+)
GRF(–)
(=)
LE(–)
MVL(–)
QRE(+)
GRL(+)
R A N G E S
A R
FRL(+)
GRL(–)
E(–)
EVQ(+)
MVQ(+)
EL
EM(+)
MV(+)
O N K M A N

Figure 2. 1:100 000 Outdoor recreation features map.

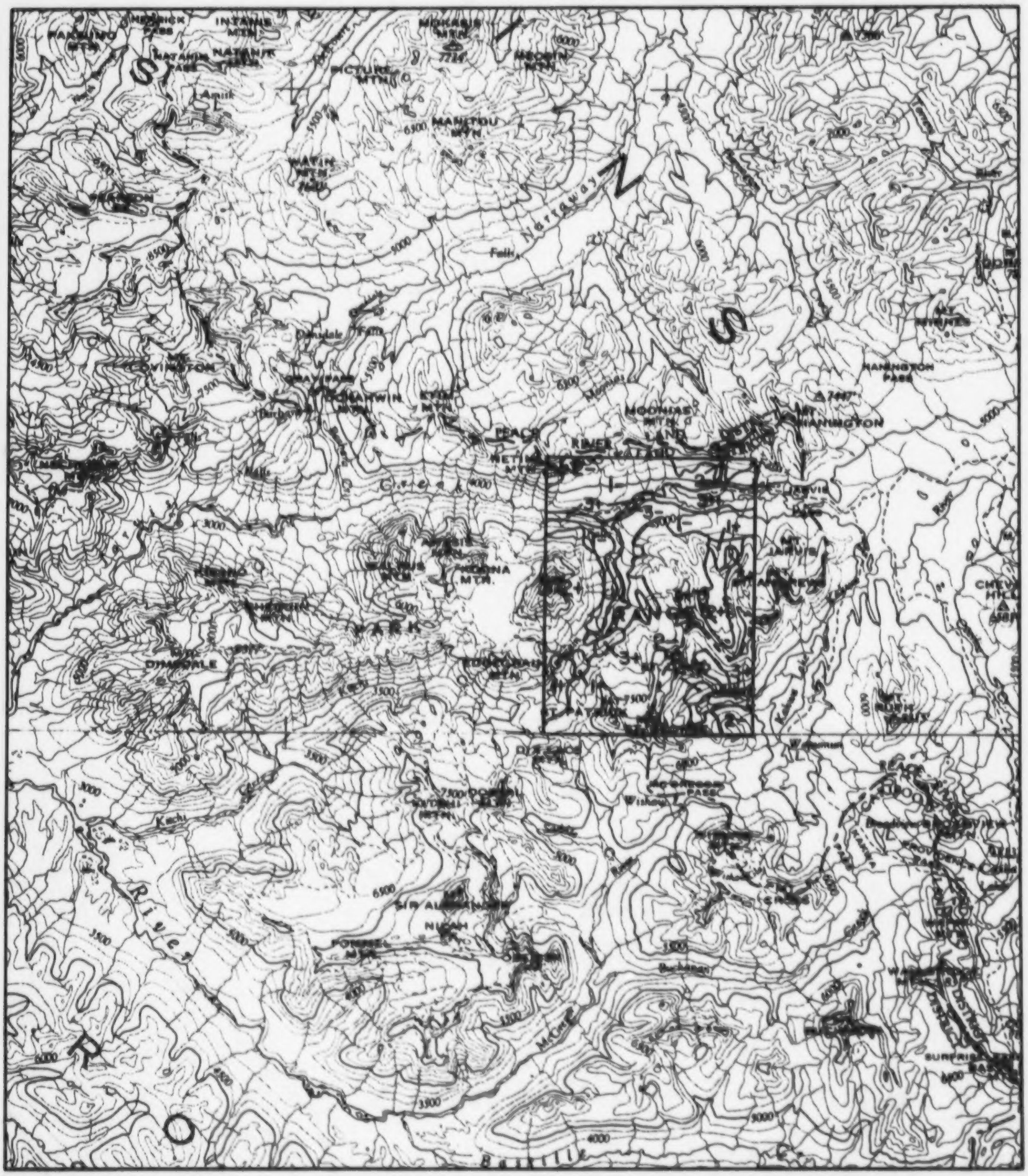
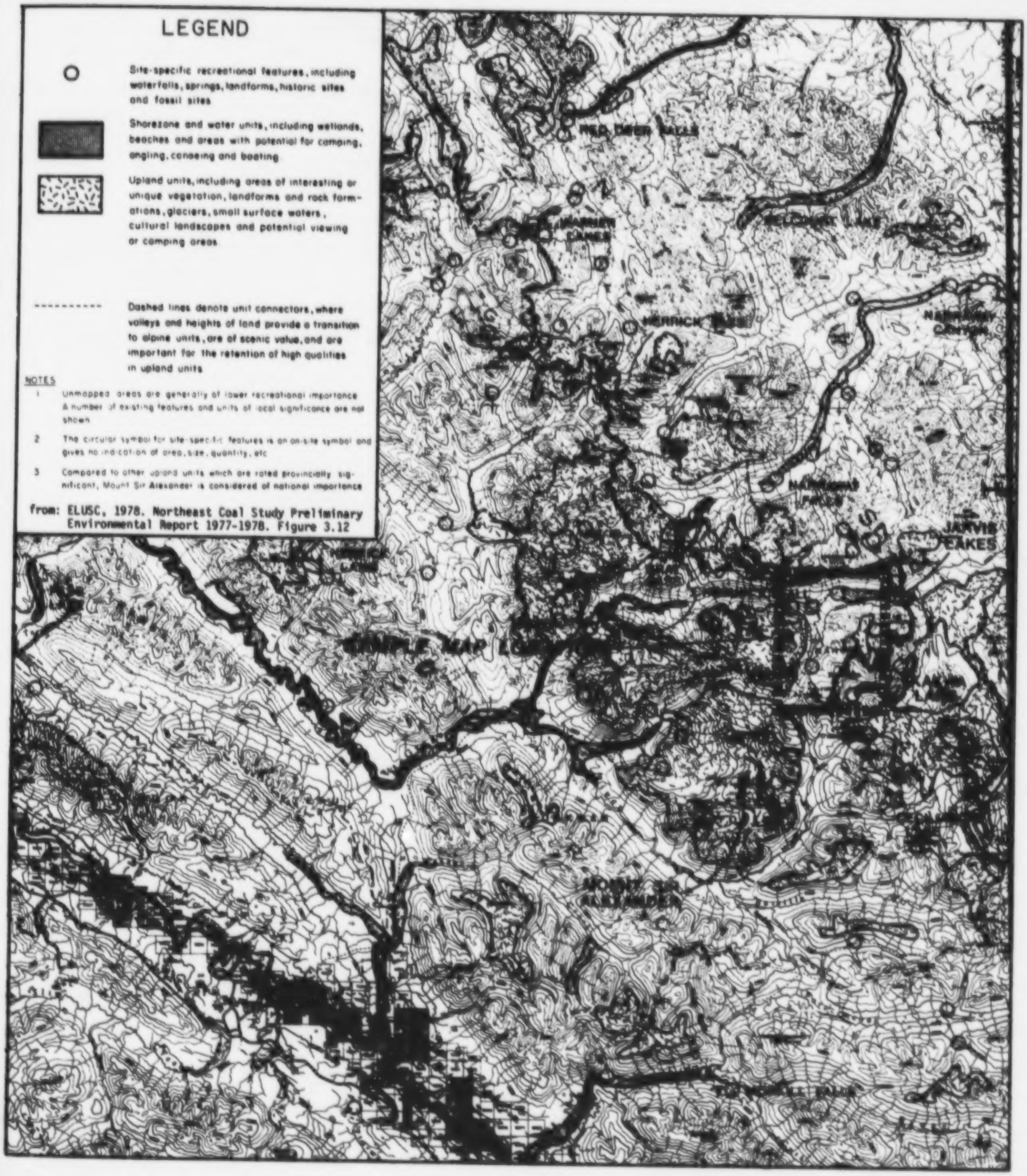

INTANIE MTN
PICTURE MTN
MANITOU MTN
Narraway
Falls
COVINGTON
PEACE
RIVER
MOONIAS MTN
HANINGTON PASS
MT HANINGTON
PARK
Creek
Kachi
River
Buchanan
S
N
S
R
O

Figure 3. 1:250 000 Outdoor recreation features map.


LEGEND
○ Site-specific recreational features, including waterfalls, springs, landforms, historic sites and fossil sites
▨ Shorezone and water units, including wetlands, beaches and areas with potential for camping, angling, canoeing and boating
▨ Upland units, including areas of interesting or unique vegetation, landforms and rock formations, glaciers, small surface waters, cultural landscapes and potential viewing or camping areas
---------- Dashed lines denote unit connectors, where valleys and heights of land provide a transition to alpine units, are of scenic value, and are important for the retention of high qualities in upland units
RED DEER FALLS
JARVIS LAKES
MOUNT SIR ALEXANDER

NOTES

1 Unmapped areas are generally of lower recreational importance. A number of existing features and units of local significance are not shown

2 The circular symbol for site-specific features is an on-site symbol and gives no indication of area, size, quantity, etc

3 Compared to other upland units which are rated provincially significant, Mount Sir Alexander is considered of national importance

from: ELUSC, 1978. Northeast Coal Study Preliminary Environmental Report 1977-1978. Figure 3.12

Figure 4. 1:500 000 Outdoor recreation features map.

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Zwinger, A. and B. Willard. 1972. Land Above the Trees. Harper and Row, New York.

* Pertain specifically to Visual Resource Assessment and Management.

chapter three

Gathering Information - Recreation F[illegible]

chapter three

PROCEDURE FOR GATHERING INFORMATION IN AN OUTDOOR RECREATION FEATURES INVENTORY

3.1 Introduction

In the course of carrying out a features inventory and producing recreation feature maps there are three basic steps or stages.

1. preliminary analysis, prior to field work;
2. field work; and
3. post-field-work finalization of maps and report writing.

3.2 Analysis Prior to Field Work

3.2.1 Research

Most information gathering, aside from field work, is ideally carried out prior to the field season. Publications on: outdoor recreation use; native and European settlement; history; land use; landforms and bedrock geology; climate; vegetation; wildlife; etc., should be reviewed to gather background information on a study area.

3.2.2 Air Photo Interpretation

Aerial photographs can be used to obtain up to 90% of the recreation features information. They are particularly important in British Columbia because:

1. ground access is limited throughout much of the Province, and it is not feasible to fly across every part of a study area; and
2. the complexity of terrain, climate and vegetation in B.C. leads to a great variety of recreation features; air photos are the best approach to mapping this variety when inventorying a large area.

Air photos are useful both in the assessment of recreation potential and as an aid to recreation planning at a number of levels. For the sake of convenience, three general levels of detail may be recognized:

1. Reconnaissance Inventory and Regional Planning
   Air Photo Scales: 1:60 000 (1:30 000 to 120 000)
   Mapping Scales: 1:125 000 (1:50 000 to 1:250 000)
   Example: CLI Recreation Capability Inventory.
2. Detailed Inventory and Preliminary Site Investigation
   Air Photo Scales: 1:15 000 (1:10 000 to 1:60 000)
   Mapping Scales: 1:20 000 (1:10 000 to 1:50 000)
   Example: Master plan for a Park or Recreation Area
3. Site Planning
   Air Photo Scales: 1:100 to 1:1 000
   Mapping Scales: 1:50 to 1:200
   Examples: layout of roads, trails, camping pads, services.

It is important to complete a considerable proportion of the required air photo interpretation before entering the field. This gives one an opportunity to:

1. obtain an overview of the area; and
2. carry out a preliminary delineation of feature units, select ground check points, and air flight and boat reconnaissance routes, and generally to make the most efficient use of field time.

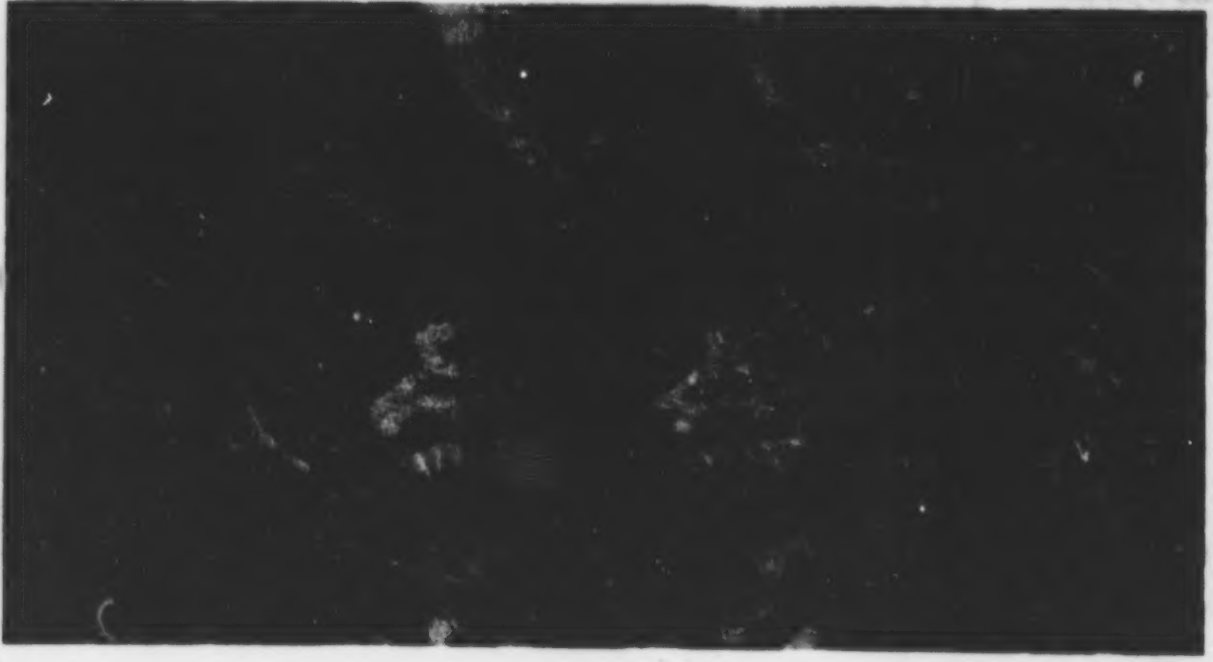
The ease with which recreation features can be delineated through air photo interpretation varies considerably. Table 2 provides a guide to the usefulness of air photos in identifying these features. Figure 5 provides an example of an area (Conner Lakes in the East Kootenays) for which air photos have been used to assist in the identification of the location and type of recreation features present.

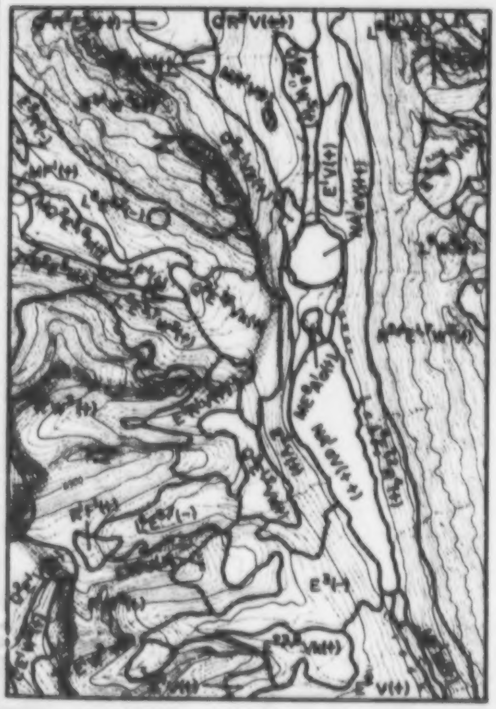
Table 2. Air photo identification of recreation features and activity potential.

FEATURES	AIR PHOTOS		
	Very Useful	Useful	Limited
BIOTIC			
Aquatic-Biotic			
pools, fish barriers, aquatic plants		x	
estuaries, saltmarshes	x		
Vegetation			
crown density, open stands, zonal characteristics, tree species, marshes, bogs, swamps, alpine, grasslands, shrub zones	x		
nuisance plants, ground cover		x	
Vegetation-Wildlife			
mature timber, crown density, alpine meadows, marshes, estuaries grasslands, shrubs zones, forest zones	x		
winter ranges, habitats, breeding areas, mineral licks		x	
unique species, special communities			x
PHYSICAL GEOGRAPHIC			
Glaciers			
moraines, view sites, crevasses	x		
Landforms and Rock Features			
rock arches, natural bridges, hoodoos, horns, eskers, oxbows, cliffs, fans, deltas, escarpments, exposed stratification, sand dunes, drumlins, lava flows, volcanic cones, cirques, slumps, slides	x		
karst, columnar basalts		x	
caves, rock collecting areas, fossil beds			x

FEATURES	AIR PHOTOS		
	Very Useful	Useful	Limited
Landscape Patterns			
view sites, promontories, topographic variety, distribution of natural versus cultural landscapes, distribution of streams, lakes, pools	x		
panoramas, scenic corridors		x	
WATER ORIENTED			
Beaches			
materials, gradients, offshore and backshore conditions, driftwood	x		
Waterfalls			
height, water volume, view sites, rapids	x		
Water			
water quality, offshore gradients, shore erosion, suitability for boating, tidal influences, water level fluctuations, offshore navigation hazards		x	
water temperature, depth			x
CULTURAL AND HISTORIC			
present access, harbour facilities, bridges, tunnels, interesting communities, cultural environments, historic sites, historic routes, archaeological sites, trails		x	

ACTIVITY POTENTIAL (OPPORTUNITY)	AIR PHOTOS		
	Very Useful	Useful	Limited
Water			
canoeing, boating, access to water, boat launching potential, beaching craft, harbour potential, boat cruising and viewing	x		
angling (stream mouths, pools, fish barriers)		x	
Land			
camping, hiking, viewing	x		
Winter			
cross-country and skidoo terrain, ski slopes (degree, variety, concavity of outruns, vertical distance)	x		
snow depth, snow quality, lake freezing			x





Connor Lakes in the East Kootenay is an area of significant recreational value. The main attractions include the lakes, a diversity of topography, interesting bedrock formations, fossils, sub-alpine and alpine vegetation and high wildlife values. Extensive use is made of the area for rock climbing, hiking, fishing and camping.

Air photos were used to assist in the initial identification of the location and type of recreation features present in the area. Field checking was carried out and modifications were made to the initial interpretations (see above stereo pair). This information was then transferred to the topographic map opposite. Annotation numbers that refer to present use, park reserves and access were added to the map and the related information was included in the map legend.

Approximate scale of Air photo: 1:87 000
Approximate scale of topo base: 1:67 500

Figure 5. Aerial photograph typing of recreation features.

3.3 Field Work

If possible, interviews should be carried out with individuals who have detailed knowledge of the recreation values of a study area prior to, or during early phases of, the field work (see Appendix 1). These individuals will often live within, or in close proximity to, the study area. Thus, the two tasks can usually be coordinated relatively easily. By carrying out the interviews at an early stage in the study, field checking of the information provided can be accomplished.

Selected field checks of preliminary air photo interpretations and interview information can be carried out by air, road, boat, foot and horse. During these checks, adjustments can be made on air photos, notes can be made on topographic maps, and detailed descriptions can be recorded on field inventory cards (see Appendix II).

3.4 Analysis After Field Work

When field checking is completed and all supporting data have been collected, final interpretations can be made. This phase will include: 1) finalization of air photo typing; 2) organizing slides and prints (see Appendix III - Slide and Print Index); 3) map and map legend production; and 4) writing narratives and/or supporting reports.

Once air photo typing is completed, the information should be transferred to mylar autopositive maps at the desired scale. The autopositives should be of the most up-to-date topographic base map available.

In some cases, the transfer of the information can be carried out by hand. However, it is usually more accurate and efficient to use a cartographic instrument such as an epidiascope or Kail plotter.

Once the transfer of information to the maps is complete, map legends can be finalized and attached, also in autopositive form, to each mapsheet. Blueprint copies of both map and legend can then be made. Attaching a legend to each map is important, particularly if modifications are made to the standard legend.

A written description of the study area should be provided, whenever possible, to complement the maps. This information can be presented either as a narrative attached to the margin of each map or as a separate report.

Annotation descriptions (see section 2.5.3) which are compiled for feature units should be organized by map sheet. They may be included in the narrative attached to the map or in an appendix to a report on the study area, or they may be retained in the files of the agency which has carried out the study.

The indexed slides and prints should be retained by the agency responsible for the inventory. This will ensure that they are available to any interested government agency, private company or member of the public who is reviewing the maps and reports.

chapter four

Biophysical Limitations

chapter four

ASSESSMENT OF BIOPHYSICAL LIMITATIONS TO OUTDOOR RECREATION USE

4.1 Introduction

Biophysical limitations to outdoor recreation as described in this manual, are defined as those natural elements of the landscape which determine the inherent ability of land and water units to sustain recreational use. This chapter describes:

a. physical and biological limitations of the landscape to recreational use;
b. a method of subdividing the landscape into units which exhibit more or less homogeneous biophysical limitations to overall recreational use; and
c. a method of designating these units as to their ability to support recreational use.

Recreational use exceeds the level at which the landscape is biophysically able to support it when:

1. alteration to the environment occurs to a degree which is unacceptable in relation to the resource management plans for an area;
2. an inconvenience or safety hazard exists for the user; and/or
3. an excessive cost is incurred in maintaining the quality of the site for a specified use.

The discussion of biophysical limitations in this chapter is meant to provide assistance to planners who are involved with recreational aspects of land use in understanding how to:

1. recognize the various biophysical limitations of the landscape to recreational use;
2. assess the related available biophysical information for an area of interest; and
3. determine whether additional information (and, if so, what type of information) may be necessary to make biophysical limitation interpretations.

These interpretations are of greatest value in areas where recreational use and development is presently taking place, or is being considered for the near future. They will be of assistance in the development of different management options and alternatives.

For example, areas with slight or few development limitations may not be available, or social and economic factors or land use patterns may dictate that less-than-suitable areas be developed. In such situations, recognition and understanding of biophysical limitations enables planners to estimate the costs involved, and to outline the measures necessary, to develop and maintain a particular recreational use and, at the same time, to preserve the environmental quality of an area at the level required by management objectives. Moreover, informed decisions can be reached regarding the most appropriate location(s) for recreational use and/or development when a number of similar opportunities exist (e.g. similar features, access, etc.), but the levels of biophysical limitations differ.

4.2 Biophysical Limitations

In this system, seven major groups of biophysical limitations are considered. These are:

1. Soils
2. Geological Processes
3. Topographic Expression
4. Hydrology
5. Wildlife
6. Vegetation
7. Climate

4.2.1 Soils

Much of the soils information necessary to determine the following soils limitations may be obtained through the Soils Section of the Terrestrial Studies Branch, Ministry of Environment, Victoria, B.C. or The B.C. Pedology Unit, Agriculture Canada, Vancouver, B.C.

Soil Texture

Soil texture is the relative distribution of primary mineral particles (i.e., sand, silt, clay) within a given soil. Also included under soil texture for this description are gravels (2 to 76 mm in diameter).

Texture has a direct effect upon such soil characteristics as drainage, permeability, erodibility, nutrient availability, compaction, frost heaving potential and soil shear strength. For this description, soil texture is broken into two categories, fine textured soil and coarse textured soil.

Fine Textured Soil - refers to soils high in clay and silt content which are subject to puddling and compaction and tend to become sticky and slippery when wet. These soils dry out slowly after rains. This becomes particularly significant on level areas needed for playground and campsite development where there is little surface run-off. Substantial increases in soil compaction always occurs in campgrounds and would be particularly evident in areas with fine textured soils. These soils also present limitations for septic tank facilities, particularly in wet areas, due to their poor drainage.

Plate 81. Fine textured soils in areas of impeded drainage are easily compacted and tend to become muddy very quickly. Once compacted these areas dry out slowly after rains. Although the example illustrated will likely only be a problem during the spring and early summer rains, extensive trail maintenance would be required if this was a high use area.

Coarse Textured Soils - refers to soils which are high in sand and gravel content and are often unstable when dry. Vegetation regeneration and maintenance, particularly in high use areas, is often limited by the poor nutrient availability and rapid drainage of these soils. Septic tank suitability is also severely affected by coarse textured soils that are rapidly drained.

Plate 82. Areas such as this present several limitations to concentrated use but are suitable for extensive activities such as riding, walking, and cross-country skiing. The complex topography provides limited areas for campsite or playground development and the coarse-textured, well drained soils combined with the dry climate make vegetation difficult to establish and maintain.

Generally sandy loams, fine sandy loams and loams, which are either gravelly or non-gravelly present the fewest limitations to recreational use. Sandy clay, clay, silty clay, silt, loose sand, coarse sand and gravel present the more serious soil texture limitations to such use.

Coarse Materials

Refers to particles greater than 76 mm in diameter (cobbles, stones and boulders). The amount of coarse material in the upper 50 cm of soil may be inferred from soil horizon descriptions provided in soil surveys as well as from landform texture modifiers (blocky and rubbly) as described in terrain classification (surficial geology) maps produced by the Terrestrial Studies Branch of the Ministry of Environment. If less than 25% of the volume of the upper 50 cm of soil material is made up of coarse materials, the limitation to recreational use is likely to be slight. A moderate coarse material limitation (25-75% by volume) could seriously hinder concentrated development but would not likely affect dispersed use (i.e., hiking, wilderness camping). If over 50% of the volume is made up of coarse materials, it could prohibit most concentrated recreational uses (i.e., playgrounds, organized campsites) due to clearing and levelling costs and would seriously hinder trail construction.

Rockiness

Refers to the extent of surface area which is covered by bedrock outcrops. Bedrock, by definition can include up to 10 cm of unconsolidated material. Terrain or soil classification maps will usually indicate whether bedrock is a dominant or subordinate component of a map unit.

Bedrock limitations affect building construction and prohibit the use of septic tank facilities. When associated with steep slopes, bedrock prohibits most recreation uses with the exception of rock climbing and associated activities.

Shallow Soils

Refers to materials that are shallow to bedrock or shallow to an impervious soil horizon (less than 1 metre in depth). Shallow soils present many recreational use limitations. Shallow to bedrock areas cannot easily be levelled for playgrounds; vegetation is usually difficult to establish on these soils due to high erosion potential, particularly on steep slopes; and, areas shallow to bedrock or with shallow impervious soil horizons can be limiting to the use of septic tank filter fields or pit toilets.

Terrain classification maps will usually indicate whether the material is a blanket (>1m) or veneer (<1m). Soils maps will also indicate the presence of a lithic soil component (<50 cm to bedrock) and soil horizon descriptions and classification names will indicate if impervious soil horizons are present.

Plate 83. This attractive shoreline area presents several limitations to recreational use. The steep slopes prevent easy access to and from the water. Very shallow soils and bedrock outcrops in the adjacent upland make septic tanks and pit toilets unfeasible. Should the vegetation be removed, the shallow soils on the steep slopes would be very susceptible to erosion.

Soil Drainage

Refers to the rapidity and extent of water removal from the soil by both internal water movement to subsurface horizons and by surface runoff. Soil drainage classes are defined in terms of: (i) occurrence of soil moisture in excess of field capacity, and (ii) the extent of the period during which such excess water is present in the plant root zone. These classes are as follows:

Rapidly drained - soil moisture content seldom exceeds field capacity in any horizon except immediately after water additions.

Well drained - soil moisture content does not normally exceed field capacity in any horizon for a significant part of the year.

Moderately well drained - soil moisture in excess of field capacity remains for a small but significant period of the year.

Imperfectly drained - soil moisture in excess of field capacity remains in subsurface horizons for moderately long periods during the year.

Poorly drained - soil moisture in excess of field capacity remains in all horizons for a large part of the year.

Very poorly drained - free water remains at or within 30 cm of the surface most of the year.

Soil drainage affects most recreational uses. Poorly and very poorly drained soils present severe limitations for any type of facility development (campsites, buildings, playgrounds) due to the cost of subsurface drainage installations. Imperfectly drained soils that are wet for only a portion of the year present a greater limitation to concentrated recreational use than to dispersed use. Although a decrease in infiltration as a result of concentrated use is most likely to occur on fine textured soils due to compaction, one study reports a 30-fold reduction in infiltration on a campground with sandy soils (Brown, Kalisz and Wright, 1977). In rapidly drained soils, vegetation cover is difficult to establish and maintain. Septic tank suitability is limited by both poorly drained and rapidly drained soils. Surface and groundwater contamination is likely to occur in poorly and very poorly drained soils. Rapid drainage may result in groundwater contamination as well as contamination of either adjacent waterbodies or adjacent poorly drained areas such as bogs or swamps.

Surface Organic Accumulation

Organic accumulation includes the surface litter horizons over mineral soils as well as organic soil horizons. An accumulation of from 15 to 40 cm of organic material can seriously limit concentrated recreational uses (i.e., organized campsites, playgrounds). Dispersed recreation development such as hiking trails under these conditions require specialized construction techniques. Bog, fen or swamp areas (organic accumulations over 40 cm) are considered to have severe limitations for recreational use, although their recreational feature value is often high, particularly in terms of nature interpretation. Recreational use in these areas could require considerable development expense (i.e., elevated boardwalk systems).

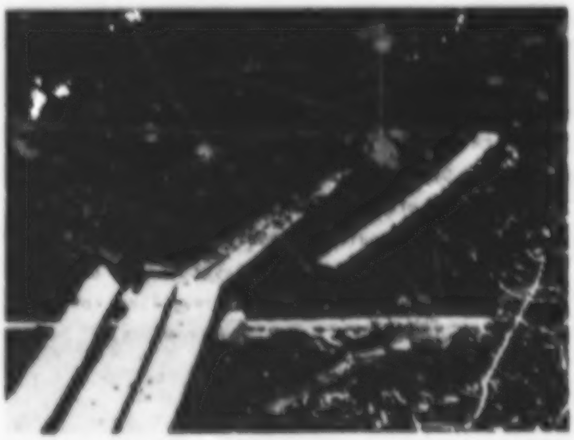


Plate 84. A very poorly drained area with an accumulation of surface organic materials. A site such as this will be wet throughout most, if not all, of the summer months. It is unsuitable for any intensive development and even with an extensive use such as hiking, considerable maintenance may be required.

4.2.2 Geological Processes

Geological processes are those processes which are currently modifying or have modified the genetic landform materials and their surface expression. Much of the information which is necessary to determine the occurrence of the following limitations may be obtained through the Terrain Section of the Terrestrial Studies Branch, Ministry of Environment. The three most serious geological processes affecting recreational use are:

1. Snow Avalanching: rapid downslope movement of snow, ice and other incorporated debris; commonly associated with areas of moderate to heavy snowfall and originating in areas of high local relief *(see Plate 25 on page 16)*.

2. **Failing Slope**: downslope movement of masses of unconsolidated materials or bedrock; slopes may be crossed by tension fractures or slump scarps.

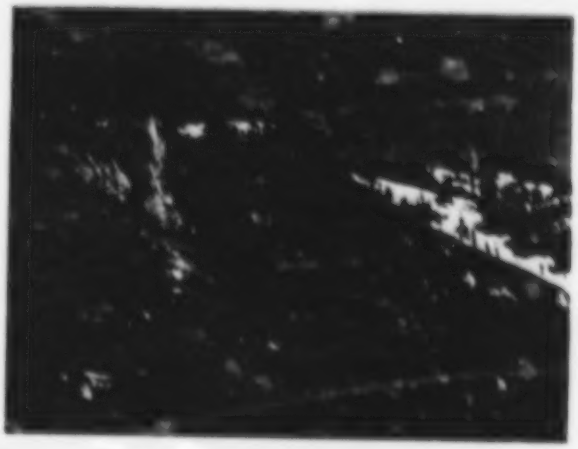


Plate 85. Failing slope.

3. **Gullying**: deep, steep-sided, parallel or sub-parallel ravines in unconsolidated material or bedrock resulting from fluvial erosion.

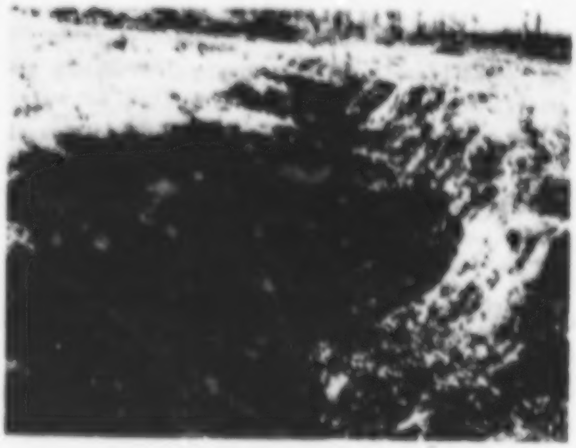


Plate 86. Gullying.

These processes all indicate an unstable landscape and pose moderate to severe limitations for most activities particularly such intensive use activities as campsite, playground and building development. Winter use in avalanche areas is extremely hazardous for all activities. Detailed analysis of snow avalanche hazard in avalanche prone areas may be warranted as part of winter recreation studies. If there is an indication that such is the case, it would be worthwhile to contact the Senior Avalanche Co-ordinator of the Ministry of Transportation and Highways.

Other processes which also affect recreational development but do not occur as frequently as those previously mentioned include:

1. **Wind Erosion or Deflation**: removal of sand and finer materials by wind action.
2. **Karst**: solution of carbonate rocks and subsequent collapse of the overlying unconsolidated materials to form sinkholes or caves *(See Plate 24 on page 15.)*
3. **Piping**: subsidence and collapse of surface materials into small hollows and channels by the removal of subsurface particulate matter by underground drainage. Silt textured materials are particularly susceptible to this process.

Generally these processes present moderate to severe limitations to intensive recreational development such as campsite, playground and building developments with associated septic tank facilities. Other more dispersed uses such as hiking, skiing and horseback riding are affected to only a limited degree by these processes.

Periglacial Processes

Are defined as processes which are associated with alpine and sub-alpine environments. These frost action induced processes not only modify the unconsolidated surface materials but also injure young plants by lifting you seedlings from the soil and exposing roots to dessication (Brink et. al., 1967). They are one of the factors which make alpine and sub-alpine environments very sensitive to recreational use. The three processes grouped into this single category are:

1. Cryoturbation - the modification of unconsolidated sediments by frost action.

2. Nivation - modification by frost action, erosion and mass wasting beneath and around a snowbank, so as to form transverse, longitudinal and circular hollows.
3. Solifluction - modification by the process of slow gravitational downslope movement of saturated, non-frozen earth material behaving as a viscous mass over a surface of frozen ground.

4.2.3 Topographic Expression

Topographic expression, as a limitation to outdoor recreational use, refers to the relief of a land unit. It can be divided into two categories, simple and complex. Simple topography refers to continuous unidirectional slopes. Complex topography refers to multi-directional slopes that form an irregular or variable surface. Slope class categories are usually provided on reconnaissance level soils and terrain classification maps.

The degree of slope greatly affects all recreational uses although the type of activity and abilities of the users affect the severity of this limitation in each case. It should be noted that soil erosion rates have been estimated to double for each 10% increase in slope where the vegetation and litter cover of the soil is less than 50% (Meeuwig, 1971).

As a rule, slopes greater than 5° (9%) constitute a severe limitation for playground areas and parking lots. Levelling costs could be very high. Slopes of greater than 9° (16%) can provide serious limitations to picnic areas, campsites and building development. Again the cost of levelling may be very high. These facilities are somewhat more flexible than the first group as they may occupy a smaller development area. Slopes of over 17° (30%) are limiting for intensive trail development (Montgomery and Edminster, 1966). This could be due to high erosion hazard, as well as high construction and maintenance costs. Slopes of greater than 31° (60%) are severely limiting for almost all uses and developments. Steep slopes, however can be important for activities such as downhill skiing and rock climbing and are often desirable for wilderness hiking and associated scenic views.

Plate 87. Slopes as steep as that illustrated will usually limit most recreational uses. However, this example presents no limitation for summer backcountry hiking along a trail at right angles to the direction of slope. The trail location is clearly visible and has remained stable. Winter use of this area on the other hand, could be very hazardous due to the potential for snow avalanches.

4.2.4 Hydrologic

Much of the information necessary to determine the severity of the hydrologic limitations as described below (with the exception of water quality) can be obtained at a reconnaissance level from the aquatic system maps and data files compiled by the Aquatic Studies Branch of the Ministry of Environment.

Currents

Refers to continuous water movement in a certain direction within a defined channel. In this section, current and its effects are dealt with as a limitation based on use safety. However, from a features point of view, these characteristics also have obvious attractivity. The limiting effects of current on recreational use can be divided into two categories:

1. effect on swiming and bathing
2. effect on canoe and kayak use

For the effect of current on swimming and bathing, the characteristics described in an aquatic systems inventory which can be used to determine, at a reconnaissance level, the severity of the limitation are: channel slope, occurrence of obstructions; and, flow character. However, such site specific features as sweepers across a stream will not be identified.

Flow character is described as follows:

1. Placid - no surface expression (flat)
2. Swirling - occurrence of eddies and boils
3. Rolling - occurrence of standing waves
4. Broken - white water and rapids, occurrence of hydraulic jumps
5. Tumbling - cascading with reasonably large drops of water

There will usually be few or no safety problems beyond normal water safety procedures for bathing and swimming if the channel slope is 0-1%, there are no obstructions (falls or chutes) and the flow character is placid. An area will not normally be suited for bathing/swimming if the channel slope is greater than 3%, falls and chutes exist and the flow character is rolling, broken or tumbling.

To determine the effect of current on canoe and kayak use, the International River Classification can be used.

The International River Classification System is as follows:

Class I - VERY EASY. Waves small, regular; passages clear sandbanks, artificial difficulties like piers; riffles.

Class II - EASY. Rapids of medium difficulty, with passages clear and wide; low ledges; spraydeck useful.

Class III - MEDIUM. Waves numerous, high, irregular; rocks; eddies; rapids with passages that are clear though narrow, requiring expertise in manoeuvre, inspection usually needed; spraydeck needed.

Class IV - DIFFICULT. Long rapids; waves powerful, irregular; dangerous rocks; boiling eddies; passages difficult to reconnoiter; inspection mandatory first time; powerful and precise manoeuvering required; spraydeck essential.

Class V - VERY DIFFICULT. Extremely difficult; long and very violent rapids, following each other almost without interruption; riverbed extremely obstructed; big drops, violent current; very steep gradient; reconnoitring essential but difficult.

These interpretations can be made at a reconnaissance level using the channel slope, occurrence of obstructions and flow character information provided by an aquatic system inventory. However, again such site specific features as sweepers across a stream, which can present a significant hazard to canoeists and kayakers, will not be identified. The most detailed information available on the potential and limitation of specific B.C. streams and rivers to canoeing and kayaking is found in guide books published by the private sector.

Banks

Refers to stream or river banks formed as a result of channelling which restrict access to a waterline recreational activity (e.g., canoeing or swimming) or, access from the water to above the bank. The characteristics described in an Aquatic Systems inventory which can be used to determine at a reconnaissance level, the severity of this limitation are: bank form; soil texture; % of bank that is vertical; and, presence of flood and side channels.

At low to moderate water flow, access is usually available to the waterline with little or no engineering required if: the bank form is flat or at repose; the soil texture of the bank is sand to gravel; the % of the bank that is vertical is 0-10%; and, there are no flood or side channels.

Access to the waterline will likely be very difficult and considerable engineering would be required if: the channel is entrenched and the bank is undercut; the % of the bank that is vertical is greater than 50%; and, flood and side channels are numerous.

Plate 88. Steep banks such as these prevent easy access to and from the stream channel and may therefore be considered a use limitation. As portions of the bank are undercut and are beginning to slump the terrace area adjacent to the bank is unsuitable for any permanent recreational development such as campsites or playgrounds.

Flooding

Refers to the periodic rising and overflowing of water out of a defined channel or lake basin.

Where the water course is within a confined channel, there are no flood or side channels and it has a stable hydrologic response there will likely be no flooding limitation. Streamsides could be used during all seasons.

A severe flooding limitation would be present where flooding occurs in response to limited rainstorms of overnight duration or in areas below dams. Such areas would usually be inaccessible during spring melt or high rainfall periods. These floods could occur where the channel is unconfined, there are numerous flood and side channels and the hydrologic response is flashy.

In B.C. it is difficult to make reliable quantitative estimates of the probability or magnitude of flooding because streamflow records are either too short or non-existent (Maynard, 1979). However, hazardous areas for large, rare flood events (e.g., those with recurrence intervals of 100 and 200 years) have been delineated on some major rivers by the Environmental Management Division of the Ministry of Environment. Where information is too limited to make these delineations, areas prone to flood may be designated using characteristics which have been identified by Miles and Harding (1978).

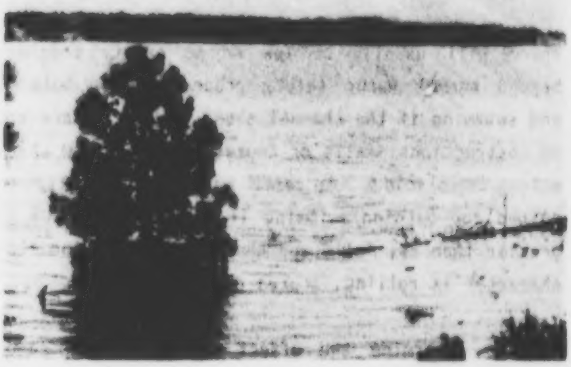


Plate 89. A portion of the drawdown zone on Lake Koocanusa during a time of high reservoir levels. Such an area is unsuitable for intensive developments such as permanent picnic sites or campsites.

Biological Nuisance

Refers to material in the water and on the shoreline which could cause an inconvenience to recreational use and possibly require periodic maintenance. The characteristics considered include: debris accumulation; % of bank overhang closure; and, presence of aquatic plants. This limitation could affect most water-based recreational activities.

Where there is no debris accumulation or aquatic plants, and the bank overhang closure is less than 15% there would be no inconvenience to swimming, canoeing and kayaking in a water course and angling in and along a water course.

Where there is much stable debris or some unstable debris, the bank overhang closure is greater than 50%, and there is considerable aquatic plant accumulation, considerable inconvenience could result, and substantial engineering maintenance could be required for recreational use to occur in or along a water course.

Plate 90. Logs and debris which constitute a hazard and inconvenience to canoeing and kayak use. Features such as these are unstable in that they may change, break-up or reform in different reaches of the water course.

Water Quality

Refers to chemical, biological and/or turbidity levels in the water. Water quality factors which should be considered include:

1. coliform count;
2. evidence of swimmer's itch, red tide;
3. water clarity;
4. biological oxygen demand; and,
5. total dissolved solids.

These water quality problems will often be associated with industrial waste disposal, community sewage disposal and large scale removal of vegetation cover. It is not likely that recreational activities will cause a deterioration in water quality. However, campgrounds located immediately adjacent to the edge of waterbodies can contribute to increased suspended sediment and coliform count.

Low or poor water quality can of course result in a situation that completely restricts water based recreation activities.

Information of this type is best obtained through the Environmental Management Division of the Ministry of Environment.

4.2.5 Faunal

Some of the information necessary to determine the severity of the faunal limitations described below can be obtained at a reconnaissance level from wildlife capability maps produced by the Terrestrial Studies Branch of the Ministry of Environment. More detailed information may be available through the regional offices of the Fish and Wildlife Branch.

Conflict

Refers to fish and wildlife populations or habitat of special importance which would be adversely affected by recreational use. The main situations which should receive this consideration are:

1. important waterfowl or marine bird nesting, staging, or wintering areas;

Plate 91. Heavy winter recreational use in important wildlife areas, such as moose winter range can lead to direct harassment of the population or can damage the environment on which the population is dependent. Recognition of these areas allows for management practices which will minimize such conflicts. Also see Plate 87 on page 58.

2. important big game rutting, birthing,

wintering, migrating or mineral lick areas;

3. important fish spawning or rearing habitat; and
4. habitat of special importance to rare or endangered fish or wildlife species.

Plate 92. Salt licks, such as the one shown where a nannie goat is licking the soil, are valuable areas for viewing wildlife. However, caution must be exercised to ensure that the animals are not harassed or disturbed in these critical areas.

These conflict limitations may not necessarily apply on a year-round basis. For example, an important nesting area may only be sensitive to use during spring and early summer.

Hazard

Refers to areas where animals may pose significant hazards to recreationists. In B.C. the situations where this limitation is most likely to be in effect are areas where grizzly or black bears concentrate (e.g. along rivers during fish spawning) or where rattlesnakes occur.

As with the conflict limitations, these hazards will often only be present during certain seasons of the year. For example, bears and rattlesnakes will not present hazards during the winter.

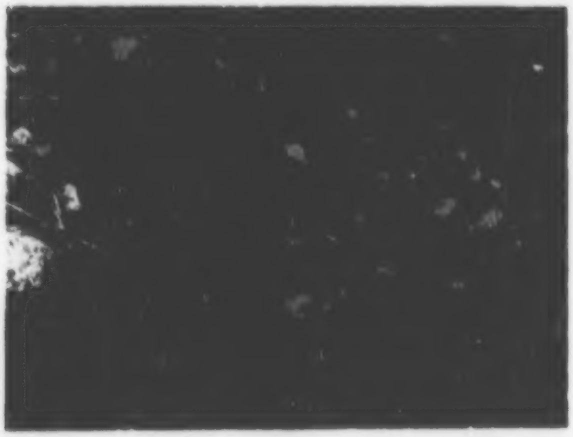


Plate 93. Specific areas where large populations of rattlesnakes are known to occur constitute a potential hazard to the recreationist during certain periods of the summer season. Although extensive uses such as wilderness hiking often occur in these areas without mishap, intensive summer development on such sites should be avoided.

4.2.6 Vegetation

Much of the information necessary to determine the severity of the vegetation limitations described below can be obtained at a reconnaissance level from the vegetation maps and data files compiled by the Terrestrial Studies Branch of the Ministry of Environment and from forest cover maps produced by the Ministry of Forests.

Vegetation Hazard/Nuisance

Refers to those plant species that commonly cause user discomfort, such as devil's club, poison ivy, cactus, and other prickly species (e.g., rose, hawthorn, blackberry, gooseberry) or create a nuisance, such as knapweed, sagebrush or needlegrass. The presence of such species can affect trail location as well as picnic and campsite location when a minimum amount of clearing is anticipated.

The severity of this limitation will be affected by the percentage of crown cover and the distribution of the species. Crown cover is defined as the area covered by the foliage of the species ignoring small openings within the foliage itself. Distribution of species is defined by means of classes of distribution patterns represented by codes. There are nine vegetation codes used in the Terrestrial Studies Branch vegetation inventories.

These vegetation codes are:

Distribution Code Number	Distribution
1	- rare individual plant
2	- a few scattered individual plants
3	- a single patch of a species
4	- several scattered individuals
5	- a few (small) patches of a species
6	- several well spaced patches of a species
7	- continuous cover of well-spaced individuals
8	- continuous dense cover with a few openings
9	- continuous dense cover

The severity of the nuisance or hazard is dependent upon the plant species which is present. For example, 20-40% coverage of devils club is prohibitive while 20-40% coverage of needlegrass is a nuisance.

Plate 94. An abundance of vegetation species such as Devil's Club as illustrated, or areas of stinging nettle or poison ivy are an inconvenience to most recreational uses. Trail development in an area such as this may involve the cutting and maintaining of a permanent trail location. In the case of poison ivy, clear posting of the area warning users of its presence may be considered necessary.

Vegetation Density

Refers to the composite density of the shrub layer (under 10 metres) and the tree stems within an area. The shrub layer density, expressed by the percentage crown cover and the distribution range of both the high and low (under 2 metres) shrubs, is related to aerial coverage and distance between shrubs. Tree stem density, expressed as the number of stems per hectare, is related to the distance between stems.

Vegetation density can affect most recreational uses and developments. Generally, when crown cover of the shrub layer is from 30-75% and there are 3700 - 25 000 tree stems per hectare (1-2 metres apart) clearing would be necessary for playground, picnic and campsite development. Clearing costs would obviously increase as vegetation density increases. With a shrub layer cover of over 75% and greater than 25 000 stems per hectare, wilderness camping and hiking could be seriously hindered. On the other hand, sparse vegetation cover (i.e., shrub layer cover of less than 30% and less than 3700 stems/hectare resulting in trees greater than 2 metres apart) may result in inadequate vegetation screening for campsite or cross country trail-snowmobile trail location.

Plate 95. Deciduous vegetation may be considered an attractive recreation feature with respect to landscape diversity. The present density of the stand shown, however, limits the type of activities which may occur and selective clearing would be necessary should uses such as campsite development take place.

Vegetation Sensitivity

Refers to the ability of vegetation to withstand stand, and recover from, recreational use. This limitation is a result of a complex of biophysical factors. Often the ability of vegetation to recover from, or to re-establish after, destructive use is of greater concern than the actual ability to withstand the use. In assessing vegetation sensitivity, the following factors should be considered:

1. habit and growth form of the plant species (i.e., its resistance to damage);
2. the ability of the species to recover from damage;
3. the ability of the species to regenerate (seed availability and germination requirements, especially for annuals and biannuals);
4. plant size;
5. competitive pressures from invading weedy or seral species;
6. site wetness and surface drought;
7. slope;
8. lack of soil cohesion;
9. compaction;
10. nutritional status of the site;
11. evapotranspiration rate; and,
12. subsequent erosion following vegetation destruction.

Concentrated campground use can cause a substantial impact on vegetation cover. Seedlings may be damaged and grasses and other hardy species may replace forb species that were present before camping use began. Under heavy use pressure, all ground vegetation cover may be removed.

Hiking trail use can also severly impact vegetation cover. In a study of hiking impact on a level trail in meadow vegetation, 300 passes reduced vegetation cover by 6%, 600 passes reduced cover by 15% and 900 passes reduced cover by 43% (Weaver, 1978).

Snowmobiling can cause damage to exposed tree seedling tops. there is also some evidence that, due to snow compaction and resultant colder soil temperatures, field crops such as alfalfa may be reduced in yield when snowmobiling occurs on a field with a shallow snow layer (Wanek, 1974).

Plate 96.

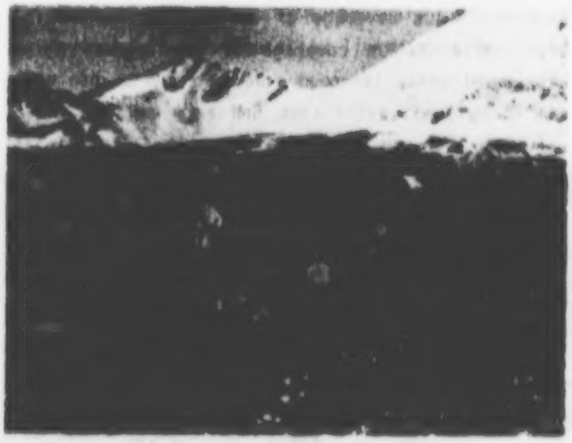


Plate 97.

Braided trails in the alpine of the Rocky Mountains. The vegetation is sensitive to use in the spring when the surface is saturated and the subsurface frozen (Plate 96). When this occurs the vegetation is quickly damaged and the trail becomes muddy. Users then tend to walk on the vegetation beside the muddy trail thus starting the cycle once again. Plate 97 shows the same area in mid-summer. At this time of the year the site is well drained and the vegetation is much more resistant to use.

Four wheel drive and motorcycle use may cause some of the most severe impacts on vegetation cover.

For example, on a level, grassy site in Montana, approximately a 30% reduction in ground cover resulted from 500 passes on a motorcycle trail (Weaver and Dale, 1978).

4.2.7 Climate

A number of climatic factors can present limitations to recreational use. Wind, particularly in association with boating hazards; extreme temperature conditions, either hot or cold; areas susceptible to intense rainfalls or heavy snowfalls; and aridity which is often caused by a combination of climate and landscape conditions, and it's effect on vegetation sensitivity or soil erodibility all constitute climatic limitations to recreation use.

The ability to define the climatic limitations of an area is dependent upon the availability of data from the Federal Atmospheric Environment Service (AES) stations throughout the province and from the climate station networks operated by the Climatology Section of the Air Studies Branch of the Ministry of Environment. No system for determining climatic limitations for recreational use is presented in this manual although a publication, Climate Suitability for Recreation in British Columbia (Bennett, 1977) is available through the Map Library of the Assessment and Planning Division, Ministry of Environment.

4.3 Limitation Classes

To organize assessments of the biophysical limitations to recreational use for large areas it is often of value to indicate limitation classes for delineated map units. These units can be defined as areas of land or water which exhibit discrete combinations of natural elements (soil texture, slope, vegetation sensitivity etc.) which from an inventory point of view, exhibit a uniform ability to support outdoor recreation use.

The basis for subdivision of the landscape into such units is the number and severity of the limitations present. This allows a comparison and assessment of different areas for recreational use and development.

For land units, soil association map units can be used very effectively to subdivide an area of study. A soil association represents a group of related soils developed on similar parent materials and occurring under similar climatic conditions. The soil map units are subdivisions or components of the soil associations and reflect differences based on soil depth, soil drainage, texture and aspect. With this information as a base, other possible limitations to recreational use can be added.

For water courses, reaches determined in aquatic system inventories can be used as the basic unit. A reach is a stream unit which is homogeneous with respect to discharge, slope and substrate. These characteristics interact through fluvial processes to establish the reach's character.

The five-class system described here is applicable to a wide range of recreational activities, and takes into account the limitations previously described in this chapter.

Class 1 - Very High

Units in this class should have a very high ability to support a wide variety of recreational uses. They will have slight to no limitations, and will suffer little or no damage under "normal" recreational use.

Class 2 - High

Units in this class will have a high ability to support a fairly wide variety of recreational uses. However, due to minor limitations, they will require some management if they are to sustain a similar intensity of use to that which is possible in Class 1 units.

Class 3 - Moderate

Units in this class have a moderate ability to support recreational use. As a result, they will not be suited to concentrated recreational activities (e.g. playgrounds, developed campsites). They will be capable, however, of supporting most dispersed forms of recreational activity (e.g. hiking, wilderness camping etc.).

Class 4 - Low

Units in this class will have a low ability to support recreational use. They will not be capable of supporting concentrated use, and even dispersed uses should be carefully managed.

Class 5 - Very Low

Units in this class will have a very low ability to support recreational use. They will impose many severe limitations on any form of recreational use, and should be avoided where possible.

Generally then, since these classes are based on the range of recreational uses and not on specific uses, Classes 1 and 2 indicate that a wide range of intensive recreational activities may be sustained. The lower three classes have a progressively increasing number and/or severity of limitations which is paralleled by a decreasing ability to sustain use. These lower classes can sustain dispersed uses within certain landscapes. For instance, a Class 3 unit with undulating slopes which range from 16 to 45%, and with areas of shallow soils and bedrock outcrops, would be unsuitable for a playground site, but may be desirable for hiking.

Guidelines for the mapping of biophysical limitations, and a listing of the symbols which can be used to designate these limitations, are presented in Appendix IV. Included in these guidelines is a description of the ranges of severity of each limitation.

Appendix IV also provides guidelines on soil and topographic limitations for specific recreational and other related uses, including picnic sites, campgrounds, path and trail development, and recreational buildings. These guidelines have been taken from a variety of background sources.

4.4 Summary

It is essential that biophysical limitation assessments be used in conjunction with recreation features inventory information. For example, an area may be well suited to organized campsite development from a limitations point of view. However, this same area may, from a features standpoint, be a poor location for such a development. Similarly, the biophysical limitations in, and around, an area with high feature value which is intended to be used for organized outdoor recreational purposes, may significantly influence the type and intensity of development which can take place.

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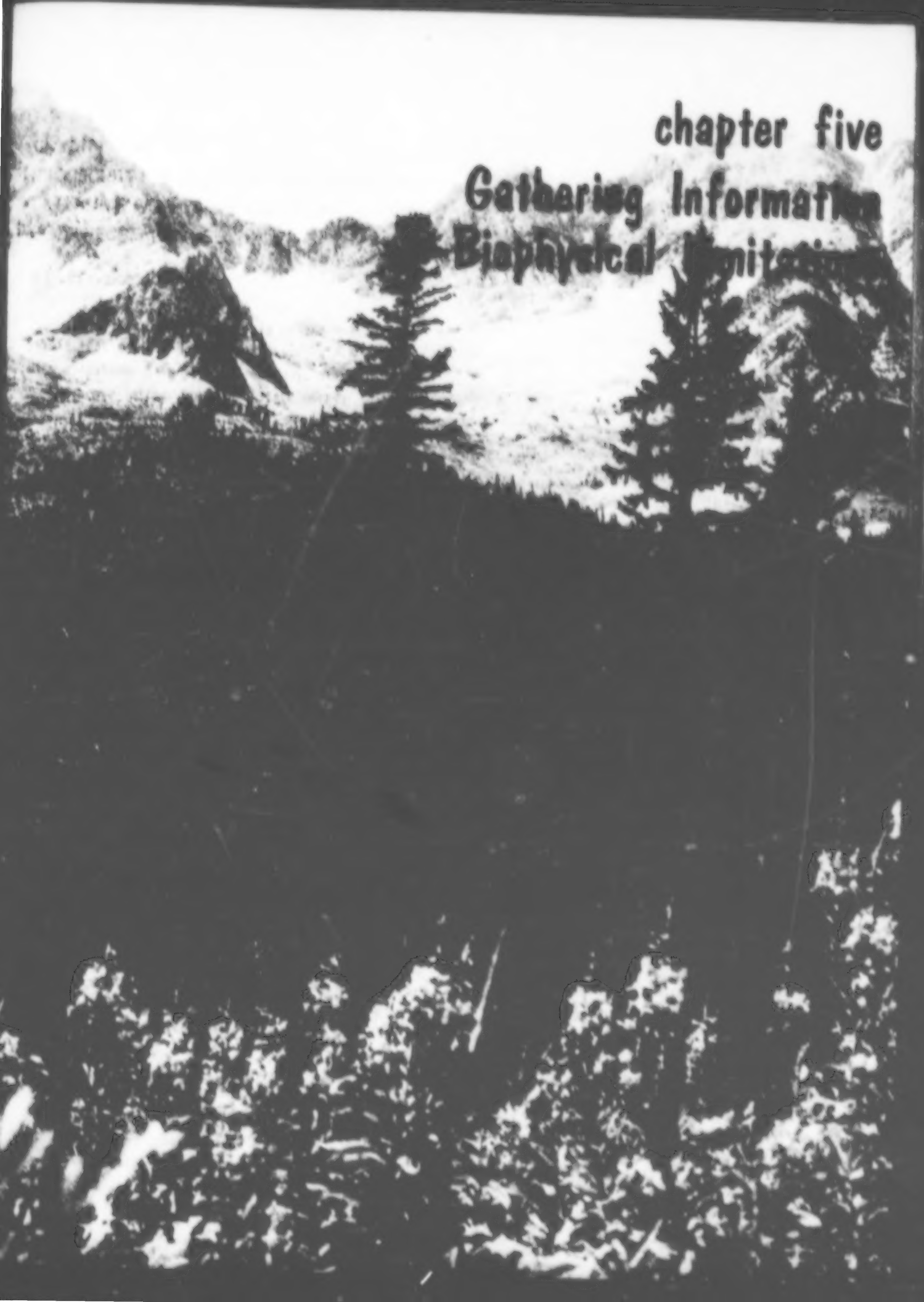
chapter five

Gathering Information Biophysical Limitations



chapter five

PROCEDURE FOR GATHERING INFORMATION TO DETERMINE BIOPHYSICAL LIMITATIONS TO OUTDOOR RECREATION USE

5.1 Introduction

In carrying out an analysis of the biophysical limitations to outdoor recreation use, there are, as with a features inventory, three basic stages:

1. preliminary work (pre-field work);
2. field work; and
3. finalization of interpretations.

5.2 Analysis Prior to Field Work

5.2.1 Reconnaissance Maps and Reports

Prior to the field season, all pertinent information that has been previously generated for the study area should be reviewed. This may include:

1. soils maps, accompanying legends and reports; they should provide information on:
   - soil texture;
   - slope;
   - soil drainage;
   - approximation of soil depth;
   - stoniness; and
   - occurrence of organic soils;
2. surficial geology or terrain classification maps, accompanying legends and reports; they should provide information on:
   - the occurence of bedrock;
   - the occurrence of shallow surficial materials;
   - texture of surficial materials; and,
   - landform-modifying processes which indicate the presence of geological hazards.

   In some cases, both soils reports and terrain reports may include interpretations for recreation use which will be useful in assessing biophysical limitations;
3. vegetation maps, legends and accompanying reports; with this information, it should be possible to determine the:
   - occurrence of dense undergrowth;
   - occurrence of nuisance or hazard species; and
   - location of areas of fragile vegetation;
4. description of the general climate of the area where annual records may be available for temperature, precipitation, and possibly moisture indices;
5. aquatic system maps, accompanying legends and reports which may provide information on currents, stream banks, flooding and biological material in waterbodies; and
6. wildlife capability maps, legends and reports which may provide information on possible wildlife conflicts and hazards.

5.2.2 Government Agency Information Sources in B.C.

The Terrestrial Studies Branch of the B.C. Ministry of Environment produces soil, surficial geology (terrain), vegetation and wildlife capability maps and reports. The Pedology Unit of Agriculture Canada, Vancouver, B.C., also produces soils maps and reports. The Aquatic Studies Branch of the Ministry of Environment produces aquatic system maps and reports, and the Air Studies Branch produces climate maps and reports. The Inventory Branch of the Ministry of Forests produces Forest Cover maps.

In addition to this inventory information, the regional offices of the Ministry of Environment can often provide valuable inputs into the assessment of biophysical limitations to recreational use.

5.2.3 Detailed Analyses

If available information is inadequate, it may be necessary to carry out more intensive site assessments. This may be possible either through the use of consultants or by requesting assistance from government agencies such as the Terrestrial Studies Branch. Arrangements to have these detailed analyses carried out should be made well in advance of deadlines for the completion of a project or study.

5.3 Field Work

Once all the available information is reviewed it is important that selected field checks are made to confirm the interpretations. It may be worthwhile to carry out at least one on-site visit with the specialist (or specialists) who compiled the most crucial biophysical information.

5.4 Final Interpretations

If biophysical limitations to outdoor recreation use are being assessed for a small area, detailed descriptions and management recommendations can be made. However, in situations where a fairly large area is being assessed, it may be necessary to subdivide the area into map units. Both the types and level of the biophysical limitations present may be symbolized on these map units. For more information on biopnysical limitations for outdoor recreation mapping conventions see Appendix IV of this manual.

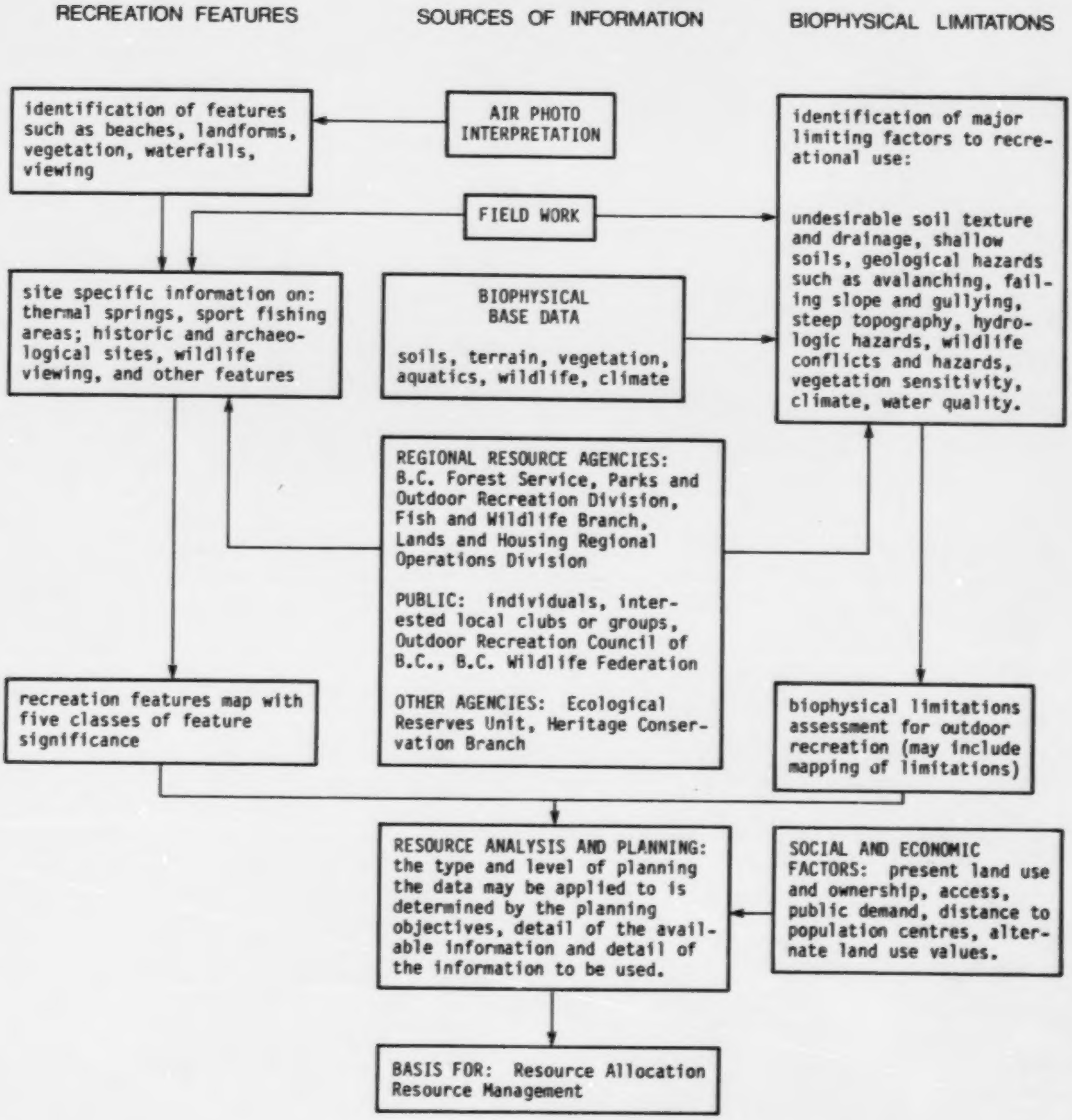

RECREATION FEATURES
SOURCES OF INFORMATION
BIOPHYSICAL LIMITATIONS
identification of features such as beaches, landforms, vegetation, waterfalls, viewing
AIR PHOTO INTERPRETATION
identification of major limiting factors to recreational use:
FIELD WORK
undesirable soil texture and drainage, shallow soils, geological hazards such as avalanching, failing slope and gullying, steep topography, hydrologic hazards, wildlife conflicts and hazards, vegetation sensitivity, climate, water quality.
site specific information on: thermal springs, sport fishing areas; historic and archaeological sites, wildlife viewing, and other features
BIOPHYSICAL BASE DATA
soils, terrain, vegetation, aquatics, wildlife, climate
REGIONAL RESOURCE AGENCIES: B.C. Forest Service, Parks and Outdoor Recreation Division, Fish and Wildlife Branch, Lands and Housing Regional Operations Division
PUBLIC: individuals, interested local clubs or groups, Outdoor Recreation Council of B.C., B.C. Wildlife Federation
OTHER AGENCIES: Ecological Reserves Unit, Heritage Conservation Branch
recreation features map with five classes of feature significance
biophysical limitations assessment for outdoor recreation (may include mapping of limitations)
RESOURCE ANALYSIS AND PLANNING: the type and level of planning the data may be applied to is determined by the planning objectives, detail of the available information and detail of the information to be used.
SOCIAL AND ECONOMIC FACTORS: present land use and ownership, access, public demand, distance to population centres, alternate land use values.
BASIS FOR: Resource Allocation Resource Management

Figure 6. Summary of procedures followed in gathering recreation features and biophysical limitations information.

Appendices

APPENDIX I

The Interview Process in an Outdoor Recreation Features Inventory

OBJECTIVES

This appendix describes a technique for interviewing individuals to obtain recreation features information in areas about which they are intimately familiar. Specifically, the objectives of the following discussion are:

1. To define, discuss, and illustrate procedures for interviewing local citizens about recreation features; and,
2. To establish effective methods of organizing recreational features information obtained in these interviews so that it may be used for a variety of purposes.

ORGANIZATION OF THE INTERVIEW

The face-to-face interview process comprises five important phases: (i) preparation; (ii) contacting interviewees; (iii) field logistics; (iv) interviewing contacts; and (v) organizing the information gained from the interview in map and text form. Each of these aspects of the interview process are discussed in the following section.

Preparation

Adequate preparation is necessary so that field money and time will be put to most effective use. The time involved for preparation varies with the size of the field study area and the complexity of the information. The following three steps should be undertaken by the interview team:

a. An understanding of recreation features:
   Each interview team must be thoroughly conversant with the recreational features list (see Table 1, Chapter Two). Each interviewee will have to be approached individually, since they will relate to the questions in a different manner. Thus, a solid understanding of the recreation features inventory program will allow for a flexibility of approach.
b. An understanding of the field area: Each interview team should be familiar with the geography of their study area before they arrive in the field.
c. An understanding of existing recreation feature information:
   Interviewers should be aware of all recreation information previously collected on the study area. This will prevent duplication of effort and will allow the interview team to isolate important recreation features data.

Contacting Interviewees

If the field study area is one where no previous interviews have taken place, it is useful to pre-contact some key persons, so that they can identify those people living in their area who would be the most useful contacts. Government employees who are stationed near the field study area are useful initial contacts. It is recommended that at least one key resource person in each field study area be pre-contacted from your base office. Meetings pre-arranged from the base office should involve only those people who can provide a general overview of the area. It is not difficult to arrange a long list of probable contacts, but it is often difficult to match the interviewer's area of interest with an interviewee's field of experience.

Field Logistics

a. Scheduling interviews:
   Arbitrary schedules, drawn up in the home office, are impossible to maintain in the field. Many unforseen circumstances such as illness and logistical problems alter the availability of some contacts. Each interview team must be free to vary their schedule of interviews according to circumstance.
b. Field Office:
   A temporary office should be established where maps and reference materials can be stored and where map-coding and annotating of the interview information can take

place. If permanent government office space can be obtained, it should be used for phone and mail messages. Access to a phone, or a central secretary-receptionist who can take messages is important.

c. Field office organization:
Mapping and recording all of the interview information in the field provides more accurate information than mapping and organizing the information in the home office. If each interview team maps and organizes their information shortly after each interview, they will become aware of its strengths and weaknesses. They will then be able to adjust their future activities in that area accordingly. There is less chance of forgetting or losing information if it is mapped and annotated shortly after the interview and any confusion can be cleared up by re-contacting the interviewee immediately.

d. Field equipment and field forms:
Each interview team should be acquainted with all of the necessary equipment and forms before they travel to their field study area. Topographic maps - Each interview team should be supplied with three sets of topographic maps of their study area. All maps should be "mac-taced" for protection. Set one should remain in the field office at all times as a master-map. All information from the interviews should be coded using the recreation features symbols and entered on the master-map of the study area. The map coding of recreation features on the master-map should be done with staedler lumocolor, permanent black felt pens.

Map set two should be used in all interviews. It is important to present each interviewee with clean map sheets, as symbols and annotations on the maps would distract from the interview. The codes should be recorded on the "mac-taced" maps with Staedler, lumocolor, non-permanent felt pens, during the interview. Thus, after they have been transferred to the master-map in the field office, they can be erased with a damp cloth.

Map set three is useful in case two interviews must be scheduled one after the other, and there is no time to transfer the codes to the master-map. The third set is also useful in case the maps are damaged.

Interview annotation field file - Each field file will consist of a number of interview annotation forms as shown in Figure 1. It is suggested that only one feature symbol be used per page since this will facilitate the organization of information at the end of the interview project. Each page should be punched so that it can fit into a three ring binder. When the information from a completed interview has been coded on the master-map and all of the annotations have been checked for map reference and clarity, the annotation forms should be stored in a second three ring binder which remains in the field office.

FIGURE 1

REFERENCE	COMPLETED INTERVIEW ANNOTATION FORM (Use only 1 feature per page) HIKING TRAILS On	FIELD FORM NO.*
MAP SHEET 93P LATITUDE 55°29'N LONGITUDE 121°W	Mt. Puggins to Murray River - The hike down Puggins Mt. to the river along a trail takes 1 1/4 - 2 hrs. It's a 2000' drop to Salt Creek if one follows the ridge and stays out of the creeks.	11
MAP SHEET 93P LATITUDE 55°27'N LONGITUDE 121°W	Murray River: Ford in the Murray River at Mt. Puggins. "It is hard to predict the times one can ford the river. It depends on rains, the weather."	11

*This number refers to interview no. on a contact file card.

Field contact file - The field contact file consists of a binder containing contact cards (see Figure 2). In the event that interviewing may take place in successive years in a given field study area, it is most important that a full file of all interviewees be maintained.

Tape recorder - The use of a tape recorder in an interview is a highly specialized technique and is best avoided unless the interviewee has historical or other information which can be related with a minimum of questions from the interviewers. If tape recorders are to be used, the following three guidelines should be noted:

1. Equipment: A small, rechargeable, portable, cassette, tape recorder is the best kind of machine for face-to-face tape recordings. The tape cassettes should be of the highest quality, since jarring and the frequency of starting and stopping the tape may cause other tapes to breakdown. An auxiliary, remote, stop/start switch is useful so that the interviewer need not turn off the recorder for every pause.
2. Taping procedures during the interview: Initially permission for taping the interview must be obtained. The interviewer should allow a short on-tape pause between each question, so that the need for reversing the tape during transcribing, can be eliminated.
3. Map coding and annotating information from tapes:
   The information from a taped interview should be map coded and annotated on appropriate field forms immediately after the interview. The cassettes should be labelled and filed for future reference.

FIGURE 2: CONTACT FILE CARD

CONTACT FILE CARD	SHOULD BE INTERVIEWED:		INTERVIEW NO.
NAME:			
ADDRESS:	INTERVIEWED:		DATE:
PHONE:	IN PERSON:	BY MAIL:	INTERVIEWER:
GEOGRAPHIC REGION:	RECONTACTED:		DATE:
OCCUPATION OR RELATED INTEREST	IN PERSON:	BY MAIL:	INTERVIEWER:
COMMENTS:			

Interviewing Procedure

Each person who is interviewed will vary in personality and in the manner in which he or she relates to the questions. If an organized interview technique is established at the beginning of the field season, then more and higher quality information will be obtained during the interview schedule. It is recommended that all interviews be conducted by two people, since the tasks of interpreting the questions to the interviewee, setting the pace of the interview, keeping the interview 'on track', recording the information on maps, and recording the information in annotations, are difficult for one person to manage. Each interview team is confronted with the same problem; that of soliciting recreation feature information from a variety of people who are not likely able to define their information in a systematic, clear fashion.

Thus, we suggest that each interview be organized in the following manner:

1. Orientation - The orientation period allows interviewers and interviewees to become acquainted. During this time, the contact file could be completed (except for 'comments'). This period allows the interview team to establish confidence that the information will not be misused, to establish who they are collecting the information for, why they need the information, how the information is likely to be used, what type of report will be produced by the study, and when such a report will be available. The detail of explanation should be determined by the curiosity of the interviewee. Each interviewee should be shown the list of recreation features and a set of topographic maps of his region.

2. Question period - The questions should relate to the structure of the recreational features list. Some interviewees prefer a structured and directed interview, while others prefer a rambling interview. When an interviewee provides firsthand information on an area they should be questioned as to the number of visits and times of the year that their observations were made. If they are relating knowledge obtained from another source this should also be stated. In this way some indication of reliability of the information can be obtained. During the question period, one interviewer codes the maps, while the other interviewer records the information on the annotation form (Figure 1). Both interviewers may ask questions in order to maintain a smooth interview.

3. Closing the interview - Keeping interviewees on topic, pacing the questions, and closing the interview are techniques that are best learned by experience. Interviewers should keep in mind at all times that the interviewee is doing them a favour, not vice versa. It is important that all interviewees finish the interview with no ill-feelings.

Organizing the Information From the Interviews

Before the interview team leaves their study area, the information gained from the interviews should be recorded clearly on the annotation forms, the contact file cards should be completed, and the recreation features should be coded on the mastermap. After the interview team arrives in the home office, all recreation feature map-codes and annotations must be pooled, or collated. Collating the map-codes and annotations is important so that people working with them in the production of recreation features maps and associated reports can relate first to the interview maps and then to the annotations if necessary. The following procedures are necessary in collating the recreation features map-codes and annotations:

1. All interview annotation forms (Figure 1) must be xeroxed so that a permanent record of each interview can remain intact. Each annotated form can then be organized by recreation feature category and geographic location (see Figure 3). For

instance, vegetation annotations related to a specific location or the entire study area can be placed in one group.

2. After all the entries from all the interview annotation forms have been organized, then a new set of master-maps should be coded according to the recreation features list. Each annotation will be numbered in a manner that will relate it to a particular map-code on the master-map.

FIGURE 3
INTERVIEW ANNOTATIONS
ORGANIZED BY FEATURE (On)

On - Hiking Trail	Interviewee Number
1 Kate Edwards Trail: Part of the Kate Edwards trail is now the B.C. Forestry Road. This route is used for horseback rides. Pack trips have travelled from Dawson Creek to Kinuseo Falls.	2
2 Pouce Coupe: The area south of Pouce Coupe outlined on the map offers horseback riding (trails need to be further developed), hiking, snowmobiling and cross-country skiing which lately has been increasing in popularity.	47
3 Puggins Mountain to Thunder Mountain: A hiking route.	19
4 Monkman Pass Trail: The Monkman Pass trail is becoming a popular hiking, fishing and hunting area, especially for Albertans. The trail follows the east side of the lake and the easier route stays high before dropping down to Fontoniko Creek. "Up until 1974 I saw no one (from 1971-1974). Now there are lots of people".	3

CONCLUSION

A program of interviewing local residents about recreation features in their geographic area is a valid, effective, and efficient method of obtaining a significant amount of useful information. Such a program should work in conjunction with and preferably precede a program of recreational features inventory. This would allow field checking of information obtained during the interview program.

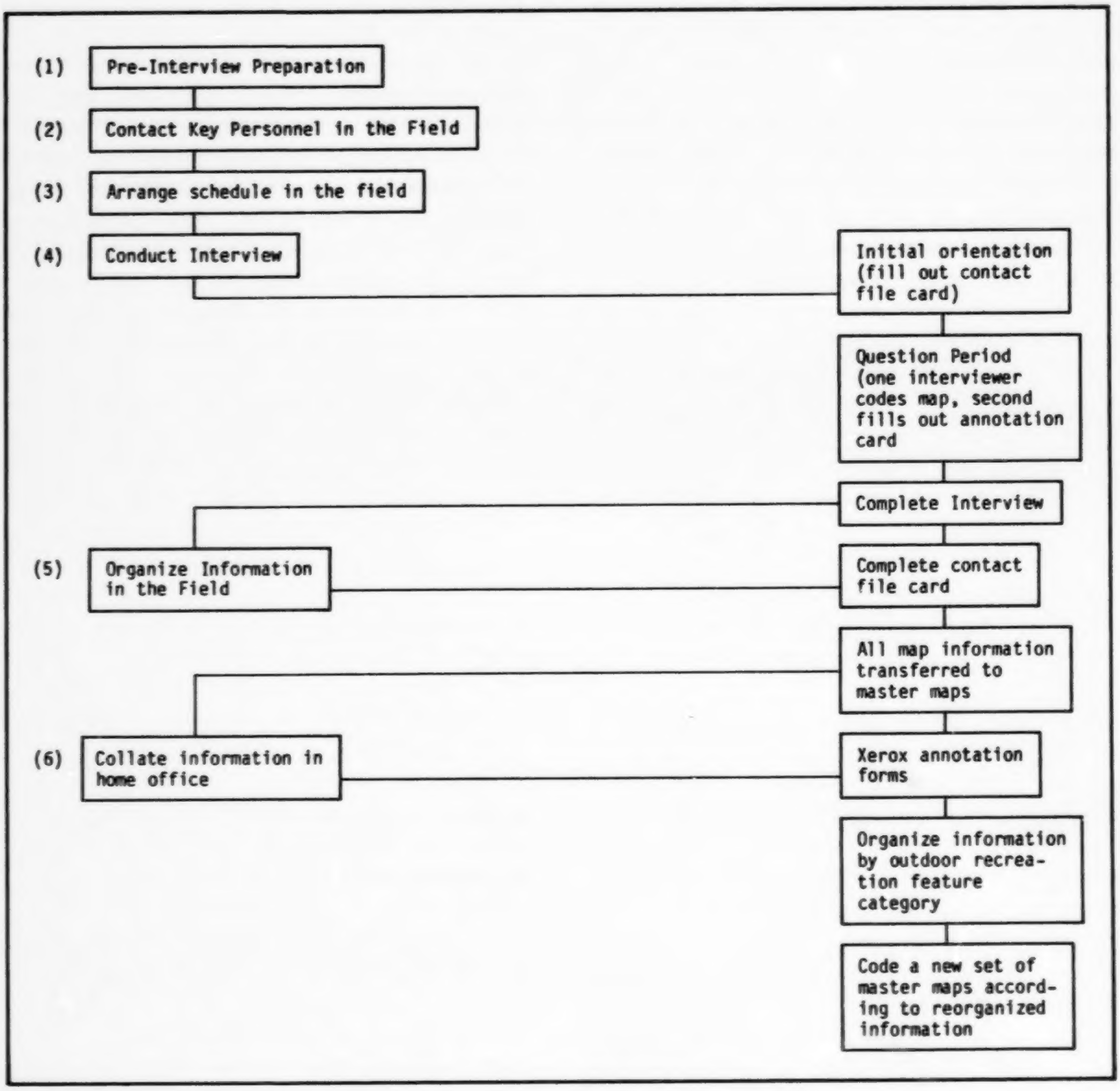

(1)
Pre-Interview Preparation
(2)
Contact Key Personnel in the Field
(3)
Arrange schedule in the field
(4)
Conduct Interview
Initial orientation (fill out contact file card)
Question Period (one interviewer codes map, second fills out annotation card
Complete Interview
(5)
Organize Information in the Field
Complete contact file card
All map information transferred to master maps
(6)
Collate information in home office
Xerox annotation forms
Organize information by outdoor recreation feature category
Code a new set of master maps according to reorganized information

FIGURE 4: FLOW DIAGRAM OF THE INTERVIEW PROCESS

LIST OF REFERENCES

THE INTERVIEW

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Richardson, S.A., B.S. Dohrenwood and D. Klein. 1965. Interviewing: Its Forms and Functions. Basic Books Inc., New York, N.Y.

University of Michigan. 1969. Survey Research Centre. Interviewers Manual. Institute for Social Research, University of Michigan, Ann Arbor, Michigan.

RESOURCE INVENTORIES USING THE INTERVIEW

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APPENDIX II

Field Inventory Cards

The following information is intended to be of assistance in the use of the Recreation Field Inventory Card (see Figure 1). The purpose of the card, is to provide a means of recording detailed information in the field about specific features and limitations with minimum time and effort and maximum consistency. The information collected can then be used to assist in making decisions about such matters as suitability of a site for development, hardiness to use and methods which can be used to overcome existing impacts. Those items on the card which are easily understood or are described in other sections of the manual are not described in this appendix.

It is important that the methods used to record the data are consistent. If deviations are necessary, they must be documented and understood. It is intended that revisions will be made in the future when methods of upgrading the cards are determined. This may include the development of a computer assisted system of information storage if it becomes warranted.

Sorting

The cards have been designed to allow manual retrieval of the stored information using a variety of parameters.

These parameters include:

Feature description
1:50 000 mapsheet
Annotation number
Description category
Field Form number
Feature subclass (used in conjunction with feature description)
Feature significance

A detailed description of how to apply the manual systemsort method of filing the information and the cards as well as copies of the cards can be obtained from the Inventory Co-ordinator, Parks and Outdoor Recreation Division, Ministry of Lands, Parks and Housing.

RECREATION FIELD CARD DEFINITIONS

First Feature, Second Feature

These are the recreation features which are described in section 2.3 of this manual. The two most important features can be indicated. Other features of lesser significance may be added to the comments section of the card.

Feature Modifier

These are the feature modifiers which are described in section 2.4. Only one feature modifier can be indicated on each card.

1:50 000 Mapsheet Number

These are the 16 1:50 000 mapsheets which occur within each 1:250 000 mapsheet. The 1:50 000 mapsheet number in which a site falls should be notched. At this time it is anticipated that cards for each 1:250 000 mapsheet will be stored in separate groups.

Annotation Number

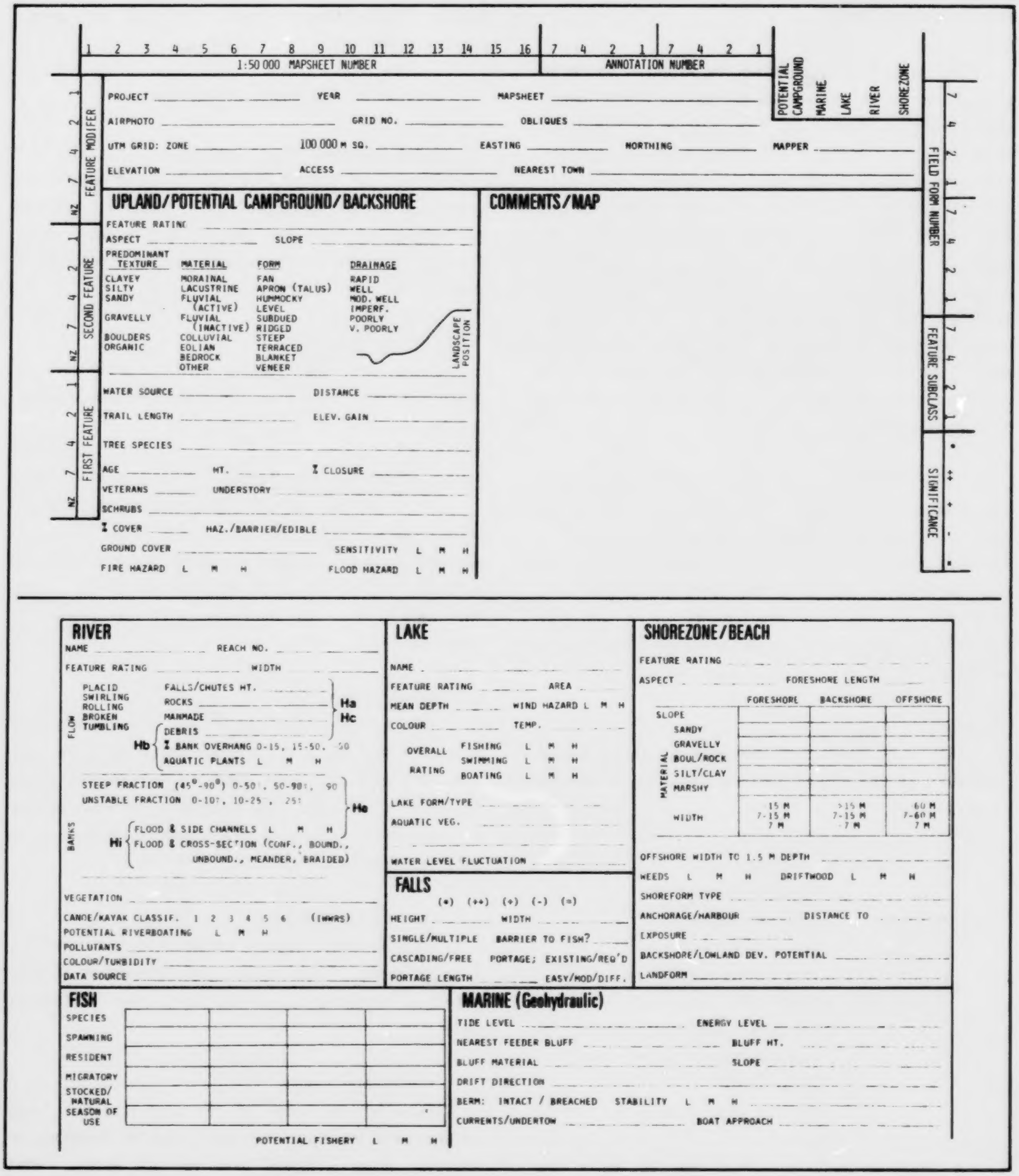
This is the number (described in section 2.5.3) which follows the significance symbol in a map unit and indicates that more detailed information about the unit is on file. The annotation information may be determined during the field work stage or may be obtained from other sources.

Description Category

This is the category for which information has been recorded on the card. The categories include potential campground, marine, lake, river and shorezone.

Field Form Number

This is the number of the card itself. These numbers are indicated for each 1:50 000 mapsheet or whatever other standard base you are using. When cards are filled out for sites in a new 1:50 000 mapsheet the numbering is re-started at one.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1:50 000 MAPSHEET NUMBER

7 4 2 1 | 7 4 2 1
ANNOTATION NUMBER

POTENTIAL CAMPGROUND | MARINE | LAKE | RIVER | SHOREZONE

FIELD FORM NUMBER: 7 4 2 1 | 7 4 2 1

FEATURE SUBCLASS: 7 4 2 1

SIGNIFICANCE: • ++ + - =

FEATURE MODIFER: 1 2 4 7 NZ

SECOND FEATURE: 1 2 4 7 NZ

FIRST FEATURE: 1 2 4 7 NZ

PROJECT ________ YEAR ________ MAPSHEET ________
AIRPHOTO ________ GRID NO. ________ OBLIQUES ________
UTM GRID: ZONE ________ 100 000 M SQ. ________ EASTING ________ NORTHING ________ MAPPER ________
ELEVATION ________ ACCESS ________ NEAREST TOWN ________

UPLAND/POTENTIAL CAMPGROUND/BACKSHORE

FEATURE RATINC ________
ASPECT ________ SLOPE ________

PREDOMINANT TEXTURE	MATERIAL	FORM	DRAINAGE
CLAYEY	MORAINAL	FAN	RAPID
SILTY	LACUSTRINE	APRON (TALUS)	WELL
SANDY	FLUVIAL (ACTIVE)	HUMMOCKY	MOD. WELL
		LEVEL	IMPERF.
GRAVELLY	FLUVIAL (INACTIVE)	SUBDUED	POORLY
		RIDGED	V. POORLY
BOULDERS	COLLUVIAL	STEEP	
ORGANIC	EOLIAN	TERRACED	
	BEDROCK	BLANKET	
	OTHER	VENEER	

LANDSCAPE POSITION

WATER SOURCE ________ DISTANCE ________
TRAIL LENGTH ________ ELEV. GAIN ________
TREE SPECIES ________
AGE ________ HT. ________ % CLOSURE ________
VETERANS ________ UNDERSTORY ________
SCHRUBS ________
% COVER ________ HAZ./BARRIER/EDIBLE ________
GROUND COVER ________ SENSITIVITY L M H
FIRE HAZARD L M H FLOOD HAZARD L M H

COMMENTS/MAP

RIVER

NAME ________ REACH NO. ________
FEATURE RATING ________ WIDTH ________

FLOW: PLACID, SWIRLING, ROLLING, BROKEN, TUMBLING

FALLS/CHUTES HT. ________
ROCKS ________
MANMADE ________
DEBRIS ________
} Ha Hc

Hb { DEBRIS; % BANK OVERHANG 0-15, 15-50, 50; AQUATIC PLANTS L M H

BANKS:
STEEP FRACTION (45°-90°) 0-50%, 50-90%, 90
UNSTABLE FRACTION 0-10%, 10-25%, 25%
FLOOD & SIDE CHANNELS L M H
} He

Hi { FLOOD & SIDE CHANNELS L M H; FLOOD & CROSS-SECTION (CONF., BOUND., UNBOUND., MEANDER, BRAIDED)

VEGETATION ________
CANOE/KAYAK CLASSIF. 1 2 3 4 5 6 (IWWRS)
POTENTIAL RIVERBOATING L M H
POLLUTANTS ________
COLOUR/TURBIDITY ________
DATA SOURCE ________

LAKE

NAME ________
FEATURE RATING ________ AREA ________
MEAN DEPTH ________ WIND HAZARD L M H
COLOUR ________ TEMP. ________

OVERALL RATING:
FISHING L M H
SWIMMING L M H
BOATING L M H

LAKE FORM/TYPE ________
AQUATIC VEG. ________
WATER LEVEL FLUCTUATION ________

FALLS

(•) (++) (+) (-) (=)
HEIGHT ________ WIDTH ________
SINGLE/MULTIPLE BARRIER TO FISH? ________
CASCADING/FREE PORTAGE; EXISTING/REQ'D
PORTAGE LENGTH ________ EASY/MOD/DIFF.

SHOREZONE/BEACH

FEATURE RATING ________
ASPECT ________ FORESHORE LENGTH ________

	FORESHORE	BACKSHORE	OFFSHORE
SLOPE			
MATERIAL: SANDY			
MATERIAL: GRAVELLY			
MATERIAL: BOUL/ROCK			
MATERIAL: SILT/CLAY			
MATERIAL: MARSHY			
WIDTH	15 M 7-15 M 7 M	>15 M 7-15 M 7 M	60 M 7-60 M 7 M

OFFSHORE WIDTH TO 1.5 M DEPTH ________
WEEDS L M H DRIFTWOOD L M H
SHOREFORM TYPE ________
ANCHORAGE/HARBOUR ________ DISTANCE TO ________
EXPOSURE ________
BACKSHORE/LOWLAND DEV. POTENTIAL ________
LANDFORM ________

FISH

SPECIES				
SPAWNING				
RESIDENT				
MIGRATORY				
STOCKED/NATURAL				
SEASON OF USE				

POTENTIAL FISHERY L M H

MARINE (Geohydraulic)

TIDE LEVEL ________ ENERGY LEVEL ________
NEAREST FEEDER BLUFF ________ BLUFF HT. ________
BLUFF MATERIAL ________ SLOPE ________
DRIFT DIRECTION ________
BERM: INTACT / BREACHED STABILITY L M H ________
CURRENTS/UNDERTOW ________ BOAT APPROACH ________

FIGURE 1. RECREATION FIELD INVENTORY CARD

Feature Subclass

The feature subclasses are described in section 2.3. The feature subclass should be indicated for the first feature. If the first feature has no feature subclass, the subclass of the second feature should be indicated.

Feature Significance

These are the feature significance categories described in section 2.2. The significance of the first feature should be recorded.

BACKGROUND/LOCATION INFORMATION

Airphoto

The following information should be recorded for the aerial photograph which covers the site being described:

1. the flight line number and individual photo number;
2. year of the photography;
3. photo scale.

Grid No.

The coordinates of the site to be described can be determined using an air photo and grid overlay (examples of the clear plastic overlay can be obtained from the Terrestrial Studies Branch).

Obliques

Photographs taken of site.

UTM Grid

The civilian system of the Universal Transverse Mercator (UTM) Projection system has been added to 1:50 000 maps for B.C. The UTM grid allows, through the use of a brief code of zone and grid-line numbers, the identification of any point on these maps even if that point is not otherwise marked or identified on the map.

UPLAND/POTENTIAL CAMPGROUND BACKSHORE

A number of parameters described in this and following sections are classified according to Low (L), Moderate (M) and High (H). These terms have the following meanings: Low - the item is present, but only as a few scattered occurrences, or in a single spot, or is likely to occur only rarely; Moderate - the item occurs in several scattered locations or a few small concentrated zones or is likely to occur at irregular intervals; High - the item is frequently present throughout the sample area, or is likely to occur regularly.

When the item is not present, or will not occur, a level is not indicated.

Feature Rating

Full outdoor recreation feature description for the area.

Predominant Texture

Clay - less than .004 mm. This material breaks down into very hard, angular lumps when dry. It is plastic and usually sticky when wet. When the moist sediment is pinched out between thumb and forefinger it will form a long flexible ribbon.

Silt - .004-.062 mm. This material breaks up into small angular fragments when compacted and dry. When these are pulverized, the sediment feels soft and floury. Dry or moist this sediment forms casts that can be handled. When moist and squeezed between thumb and forefinger, it forms a broken and rough ribbon. Very moist sediment has a soapy feel.

Sand - .062-2.0 mm. This material is loose and single grains can readily be seen or felt. When dry and squeezed in the hand, the sediment will fall apart when pressure is released. When moist sand is squeezed, a cast will form, but it will fall apart when touched.

Gravel - 2.0 - 64 mm.

Boulders - 64 - 256 mm.

Organic - Material resulting from vegetation growth, decay and accumulation.

Material

Genetic materials are classified according to their mode of formation. Specific processes of erosion, transportation, deposition, mass wasting and weathering produce specific types of materials that are characterized chiefly by texture and surface expression. For added detail, consult the Terrain Classification Manual of the Terrestrial Studies Branch.

Descriptive terminology

Morainal - the material transported beneath, beside, or within and in front of a glacier; deposited directly from the glacier and not modified by any intermediate agent. Usually poorly sorted and angular to sub-angular. May be highly compacted and have significant clay content.

Lacustrine - sediments that have settled from suspension in bodies of standing fresh water or that have accumulated at their margins through wave action. Usually fine textured with annual layers (varves).

Fluvial - materials transported and deposited by streams and rivers. Usually rounded, sorted into horizontal layers, and poorly compacted.

Ice - glacier ice.

Colluvial - product of mass wastage; materials that have reached their present position by direct, gravity-induced movement (i.e. no agent of transportation involved). Usually angular and poorly sorted.

Eolian - materials transported and deposited by wind action. Usually silt or fine sand with thin cross-bedding.

Bedrock - rock outcrop and rock covered by a thin mantle (less than 10 cm) of consolidated materials.

Other - examples may include saprolite, volcanic and marine.

Form

This refers to the surface expression of the genetic materials.

Fan - A fan shaped form that can be likened to the segment of a cone, and possessing a perceptible gradient from apex to toe. Examples include fans and deltas.

Apron - A relatively gentle slope at the foot of a steeper slope, and formed by materials derived from the steeper upper slope.

Hummocky - Steep-sided hillocks and hollows with multi-directional slopes dominantly between 10° and 35° (unconsolidated materials) and steeper (consolidated materials), and with local relief greater than 1 metre. In plan, an assemblage of non-linear chaotic forms. Examples include knob-and-kettle topography and debris of some landslides.

Level - A flat or very gently sloping (less than 5°) unidirectional surface with a generally constant slope not broken by marked elevations and depressions of greater than 1 metre relief.

Subdued - Linear and non-linear forms with slopes ranging up to 10° and with local relief greater than 1 metre.

Ridged - Narrow steep elongated hillocks with slopes dominantly between 10° and 35° (unconsolidated materials) and steeper (consolidated materials), and with local relief greater than 1 metre. In plan an assemblage of parallel or sub-parellel lineal forms. Examples include eskers and crevasse fillings.

Steep - Erosional slopes generally greater than 35° on both unconsolidated and consolidated materials. Examples include terrace scarps and lakeshore bluffs.

Terraced - Scarp face and the horizontal or gently inclined surface above it. Examples include river terraces and structurally controlled "stepped" topography.

Blanket - A mantle of unconsolidated materials thick enough to mask minor irregularities in the underlying unit, but which still conforms to the general underlying topography.

Veneer - Unconsolidated materials too thin to mask the minor irregularities of the underlying unit surface.

Drainage

For a description of soil drainage classes refer to section 4.2.1 of the manual.

Tree Species

Trees of which the crowns form the upper layer of foliage usually above 10 m in height. However, in some poorly growing stands the canopy of mature trees, may be less than 10 m in height. Table 1 provides tree species names and symbols.

Age - average age of the main tree canopy.
Height - average height of the main tree canopy.

Veterans

Trees significantly older than the trees of the main canopy. These species may have survived one or more fires and show evidence thereof in the form of fire scars. The veterans are usually isolated in distribution and often extend well above the main tree canopy.

Understory

Trees over 10 m high but reaching only below the main tree canopy are included here. In the case of seral stands the secondary tree canopy is often more or less continuous forming a distinct stratum of shade tolerant species under the main canopy of seral species.

% Closure

The total % coverage of the ground surface by the vertically projected crowns of all plants in the combined tree layer is recorded. Their % coverage cannot be less than the highest entry in any one of the three layers, and it cannot be more than the sum of all entries in all of these layers. Usually, because of crown overlaps, the actual coverage will be somewhere in-between these values.

Shrubs

The description of shrubs can be broken down into two groups.

Tall shrub layer (B1) - This stratum contains all woody plants between 2 m and 10 m high. Shrubs and advanced tree regeneration are included.

Low shrub layer (B2) - In this stratum information is recorded for all woody plants less than 2 m high. Shrubs and established seedlings (1 year old) are recorded. Note: some species are difficult to place in "woody" or herbaceous categories. As a general guideline low semi-woody plants are recorded under ground cover.

% Cover

In this layer the total % of the area covered by the vertically projected crowns of all plants in the combined shrub layer is recorded.

Haz/Barrier/Edible

Information regarding: 1) those plant species which commonly cause user discomfort, i.e., devil's-club, poison ivy, cactus, prickly species such as rose hawthorn, blackberry and gooseberry; 2) composite density of the shrub layer and tree stems as they affect free movement through an area; and, 3) plants which provide edible nuts, berries etc.

Ground Cover

This refers to the herb and moss layers. They should be described separately.

Herb layer - In this stratum herbaceous species and some semi-woody plants regardless of their height are recorded.

Mosses, Lichens, Liverworts and Seedlings - In this layer information pertaining to the bryophytes and tree seedlings (< 1 year old) can be recorded.

Sensitivity

Ability of the vegetation to withstand recreational use as well as its ability to recover from, or to re-establish after destructive use has occurred.

Fire hazard

Based on fuel loading and inflammability. Fuel loading relates to density and nature of herb and shrub layers and amount of wood on ground. Inflammability is based on the ability of material to ignite, height of water table and slope. Ratings should be made for summer months when the fire hazard would be at its highest level.

Flood hazard

Based on the occurrence of various types of evidence including: debris, old channels, soil profile, scour or erosional and/or historical information.

Comments/Map

Comments made should be referenced to the appropriate item on the card whenever possible. This can be done by placing a C and a number (e.g., C1, C2, C3...) beside the parameter which is described. This number is then placed at the beginning of the description in the comments section. Various other comments which are not accommodated elsewhere on the card can also be made. These include:

- indication of significant wildlife use;
- land use activities presently occurring;
- land status;
- weather at the time of observation;
- potential for use and types of activities which the site may support (can indicate the significance of the potential to support each activity using a scale of 0-5);
- occurrence of potentially hazardous trees if the area is presently a campsite or is being contemplated for campsite development;
- present recreational use which may be occurring, indication of overuse, origin of users (local, regional, provincial);
- existing facilities; and,
- conflicts which may be or are occurring with recreational users.

River

Reach No. - number of reach if information is obtained from aquatic inventory maps and cards.

Flow - flow character is the surface expression of the water which is determined by water velocity and bed material (see section 4.2.4).

Falls/Chutes Height - number and height (and length) of each.

Rocks - occurrence and size of rocks which may provide an obstacle to canoeing.

Manmade - occurrence of any manmade structures which are in water courses and which affect flow.

$H^a + H^c$ - refers to continuous water movement in a certain direction within a defined channel and its effect on recreation activities on and in the water. For a more detailed description of this limitation refer to section 4.2.4 and Appendix IV.

Debris - organic material deposited within the channel which may interfere with recreational use of the river. Indicate whether it is of low, moderate or high occurrence and its stability (probability of being moved by fluvial processes).

% Bank Overhang - the vegetation which projects over the water surface at the time of survey. Described in terms of the projected area of water surface covered.

Aquatic plants - plant life growing in or on the water.

H^b - refers to material in or on the water which could cause inconvenience to recreationists using the river, or would require periodic maintenance. For a more detailed description of this limitation refer to section 4.2.4 and Appendix IV.

Steep Fraction - precentage of bank along reach which has a slope of greater than 45°.

Unstable Fraction - percentage of the bank which is undergoing active erosion and slumping.

Flood & Side Channels - channels which connect to the main stream at either low or high water stages. They are characterized by low velocity flows. They may be ephemeral and can provide mosquito habitat as well as affecting access.

TABLE 1
TREE SPECIES NAMES AND SYMBOLS

Species	Common Name	Species Symbol
Abies amabilis	amabilis fir	Ba
A. grandis	grand fir	Bg
A. lasiocarpa	alpine fir	Bl
Acer macrophyllum	broadleaved maple	Mb
Alnus rubra	red alder	Dr
Betula neoalaskana	Alaska paper birch	Ea
B. papyrifera	common paper birch	Ep
B. occidentalis	western birch	Ew
Chamaecyparis nootkatensis	yellow cedar	Yc
Larix lyallii	alpine larch	La
L. laricina	tamarack	Lt
L. occidentalis	western larch	Lw
Picea mariana	black spruce	Sb
P. engelmannii	Engelmann spruce	Se
P. sitchensis	Sitka spruce	Ss
P. glauca	white spruce	Sw
Pinus albicaulis	white bark pine	Pa
P. flexilis	limber pine	Pf
P. banksiana	jack pine	Pj
P. contorta	lodgepole pine	Pl
P. monticola	western white pine	Pw
P. ponderosa	yellow pine	Py
Populus balsamifera*	poplar	Ac
P. tremuloides	trembling aspen	At
Pseudotsuga menziesii	Douglas-fir	Fd
Thuja plicata	western red cedar	Cw
Tsuga mertensiana	mountain hemlock	Hm
T. heterophylla	western hemlock	Hw

* this includes both balsam poplar (subsp. balsamifera) and black cottonwood (subsp. trichocarpa)

Source: Walmsley, M. et.al. 1980. Describing Ecosystems in the Field.

H^e - refers to stream or river banks which have formed as a result of channeling. They are assessed with respect to ease and comfort of foot access from water-line to above the bank at low to moderate flow. For a more detailed description of this limitation refer to section 4.2.4 and Appendix IV.

Flood % Cross-section - refers to the confinement and pattern of the channel(s).

confined - stream is contained within a canyon or ravine.

bounded - stream is constricted between terrace scarps or valley wall and has a narrow floodplain.

unconfined - little confinement to a stream, may be a wide floodplain, or a fan.

meander - sinuous pattern of an unconfined stream.

braided - no definite single channel; numerous small channels and bars, particularly diamond bars; characteristic of channels with high rates of bed material transport.

H^i - refers to periodic rising and overflowing of water out of a defined channel (flooding). For a more detailed description of this limitation refer to section 4.2.4 and Appendix IV.

Vegetation - vegetation along the edge of the stream within the influence of the ground water table associated with the stream. Vegetation descriptions should be divided into first and second tree story, shrub layer and ground cover (herbs, mosses etc.). Comments section may be used for detailed description.

Canoe/Kayak Classification - the International River Classification System grade level should be indicated (see section 4.2.4). If the stream is unnavigable no rating is necessary.

Lake

Wind Hazard - the occurrence of winds which may present a hazard to users of small open boats and canoes during the season of use.

Lake form/type - general configuration of shorezone of the lake can be described. This may vary from an irregular shoreline with numerous bays and a gently sloping backshore/upland to an even shoreline with an upland that rises steeply from the lake edge.

Shorezone/Beach

Foreshore - for a marine foreshore it includes all that part of the beach which is regularly covered and uncovered by the tide (intertidal zone). On a tideless beach (freshwater lake) this zone will be very narrow, only extending the distance between the limit of the swash and backwash of the larger waves.

Backshore - along a marine shore, the zone above the limit of the swash of normal spring tide extending from the berm back to the farthest point reached by waves. It may be a narrow storm berm, or it may constitute a broader complex of berms, marshes, meadows, or dunes landward of the high tideline.

- along a lake shore an arbitrary area 30 metres back from the high water mark. If more detailed description of the backshore is necessary fill out the upland/potential campground section.

Offshore - along a marine shore, extends from the uppermost point always covered by water to a depth at which substantial movement of beach material ceases, under normal circumstances. This limit is usually about 30 feet below the low tide level. This zone often anchors extensive eel grass and kelp beds. If it is not possible to describe the marine offshore to its deepest extent, or if a lakeshore is being described, an arbitrary point of 1.5 metres can be used.

Material - see texture descriptions given in Upland/Potential Campground/Backshore description.

Shoreform type - This is the form which the shorezone has assumed as a result of wind, wave and tidal action. Shoreforms which are described in section 2.3.3 of the manual are estuary, tidal marsh, lagoons, tidal flats, rock platforms, spits, points, tombolos and pocket beaches.

Anchorage/harbour - comment on the natural potential of the site for boat anchorage, moorage and launching.

Landform - if desired a description of the shorezone using the terrain classification system can be made.

Marine (Geohydraulic)

Tide level - level of the tide at time of observation.

Energy level - refers to the energy level of the waves as they break on the beach. This is usually a function of exposure.

Nearest feeder bluff - bluff which is the source of beach material. Material is removed from the bluff by: 1) hydraulic and pneumatic pressure of water moving at high velocity; and 2) impact of water laden with rock or wood fragments. This section will be left blank when there is no obvious material source feeding the shorezone being described.

Drift direction - the direction in which material is being carried along the shorezone by the surf and swash action of the waves and by long shore currents.

Berm - a nearly horizontal ridge or terrace of sand and/or gravel brought ashore by waves. In the summer the berm may be low and wide, in the winter high and narrow. As well as indicating whether it is intact and its stability, a description of the composition (texture) of the berm can be given.

Boat approach - an indication of suitability for boat approach and anchorage at low tide. Factors to consider include exposure, water depth, occurrence of exposed rocks and small islands and size of potential area.

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APPENDIX III

Slide and Print Index

This appendix describes a method which can be used to index and store slides and prints taken of a study area allowing their easy reference during map finalization and report writing. Such organization also allows government staff, private industry or members of the public to access this material in support of their use of published maps and reports.

Methods of Storage

Slides are stored in plastic sheets (20 slides per sheet) which hang from bars. These sheets are then stored in standard three drawer filing cabinets. Over 10,000 slides may be retained in one filing cabinet. The slides can be viewed on a light table without physically handling them.

Those slides which are particularly valuable should be protected from light and the effects of the plastic sheets by storage in metal slide storage cabinets.

Method of Indexing

Slides can be indexed using the Ministry of Environment watershed coding system. This system is briefly described at the end of this appendix.

The code number is placed on the top of the slide sheet, as well as on each slide (see Figure 1). Each slide is also numbered from 1 to ? for each watershed. If desired the watershed boundaries can then be outlined on 1:50 000 and/or 1:250 000 base maps and the number and location of each slide indicated within each watershed. This allows quick, exact slide location reference (Figure 2). The information may also be drafted onto a Mylar autopositive of the base map to allow duplication.

Another method of indexing slides is to describe the location at which the photograph was taken by using the Universal Transverse Mercator (UTM) grid system now added to topographic maps.

FILING SYSTEM FOR PRINTS AND NEGATIVES

Negatives

Hanging plastic sheets (similar to those for slides) which have pockets suitable for negative sheets are used. These hanging sheets are stored in a similar manner to that for the slides. Watershed and mapsheet locations are placed on the sheets.

Prints

Prints are stored on file cards. Two prints are placed on one 6" x 10" card. The watershed code, slide number and other information is placed on the file card below each photo. Using this system the prints can be indexed by geographic location (watershed, N.T.S. sheet) and theme (recreation feature illustrated, etc.). Retrieval according to location or theme is quite easy. Again using an appropriate sized filing cabinet, a large number of prints can be stored in a reasonably small space.

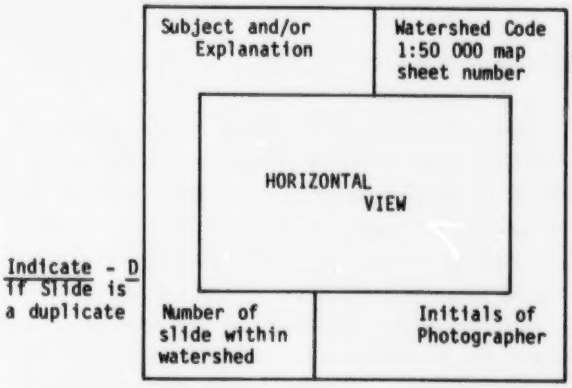
Subject and/or Explanation
Watershed Code 1:50 000 map sheet number
HORIZONTAL VIEW
Indicate - D if Slide is a duplicate
Number of slide within watershed
Initials of Photographer

FIGURE 1.- the final coding for watershed, 1:50 000 mapsheet and slide number can be typed on white stick-on labels.

EXAMPLE OF SLIDE AND PRINT INDEXING USING A 1:250 000 SCALE MAP

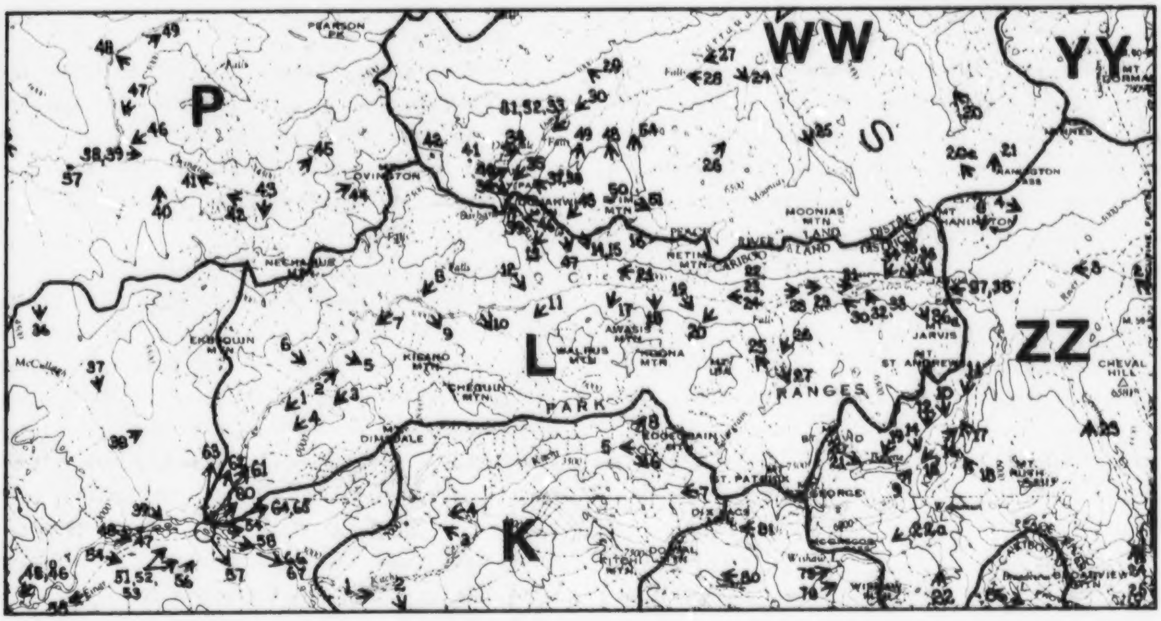

FIGURE 2. Recreation and visual slides Northeast Coal Extension area (1977). Letters have been used to replace aquatics code for simplification. The codes can easily be added opposite the letters on an attached legend. Approximately 500 slides were indexed in this manner.

AQUATICS SYSTEM WATERSHED CODE

The watershed coding system was developed to provide a hierarchical storage access number for all streams in British Columbia which appear on 1:50 000 NTS topographic maps. A unique number can be made available for up to the seventh tributary of a river flowing into the ocean. The system can then be used to index any basin-oriented data. To date, approximately 80% of the province has been numbered. For more detailed information on the system, refer to P. Shera, and D. Grant, 1980. A Hierarchical Watershed Coding System for B.C., Ministry of Environment, Victoria, B.C.

Code Number Structure

The watershed number is in the form of a 21 digit number presented as follows:

3 - - - - - - -	Columbia River
34- - - - - - -	Lower Kootenay River
34-0700- - - - -	Slocan River
34-0700-110- - - -	Little Slocan River
34-0700-110-030- - -	Koch Creek
34-0700-110-030-040- -	Grizzley Creek
34-0700-110-030-040-020-	Greasbill Creek
34-0700-110-030-040-020-010	North Greasybill Creek

The underlined digits in each group represent open numbers for subsequent addition of previously unnumbered streams at the various tributary levels. (Underlining is for the purpose of explanation only and does not appear in actual usage).

The upstream progression from left to right is apparent. In the example presented, N. Greasybill Creek is a partially intermittent creek draining an area of about 10 km^2. Extensions of the number to smaller gullies, etc., can be made but are not part of the computerized data storage system.

Unused number groups are dropped in practice (e.g. 34 0700 = Slocan River).

Within the 3 (or 4) digit groups, streams are numbered sequentially going upstream on the mainstem. For example, 030 (Koch Creek) is further upstream than 020 (Talbott Creek) on the Little Slocan River.

Major Watersheds (Two-Digit Numbers)

Table 1 lists the major (two-digit) tributaries in B.C. Departures from a strict hierarchy in the Fraser system have been made in the case of the South and North Thompson Rivers, and for the Stuart which is tributary to the Nechako.

The Mackenzie system has been modified considerably to handle rivers entering B.C. at different places. The Hay, Liard and Peace Rivers are all tributary to Great Slave Lake, whose outlet is the Mackenzie. The Chief and the Muskwa are both tributary to the Fort Nelson, as the Wapiti and Kakwa are to the Smokey.

The Upper and Lower Kootenay have been separated at Libby for mapping convenience. The 90 series handles other coastal and island rivers as indicated.

A 1:2 000 000 scale map of the major watersheds and their code numbers is available from the Map Library, Assessment and Planning Division, Ministry of Environment, Parliament Buildings, Victoria, B.C., V8V 1X4.

TABLE 1.

MAJOR WATERSHEDS IN BRITISH COLUMBIA

** Indicates completion of sub-watershed coding (with allowance for further additions)

* Indicates partial completion of sub-watershed coding.

01	Fraser River*
02	Lillooet-Harrison rivers**
03	Thompson River (From mouth to confluence of North and South Thompson)
04	South Thompson River*
05	North Thompson River*
06	Chilcotin River
07	Quesnel River
08	West Road River
09	Nechako River
	Stuart River
11	Liard River**
12	Petitot River
13	Fort Nelson River
14	Sikanni Chief River (Tributary to Fort Nelson River)
15	Muskwa River (Tributary to Fort Nelson River)
16	Beaver River
	Toad River
17	Kechika River
18	Dease River
19	Rancheria River
20	Peace River and Finlay River* (Tributary to Mackenzie River)
21	Kiskatinaw River**
22	Beatton River
23	Pine River**
24	Halfway River
25	Parsnip River** (And Parsnip Arm)
26	Smoky River**
27	Omineca River
28	Chinchaga River (Tributary to Hay River)
29	Hay River (Tributary to Mackenzie River)
30	Columbia River**
31	Okanagan River
32	Kettle River
33	Pend Oreille River*
34	Lower Kootenay River**
35	Upper Kootenay River**
36	Illecillewaet River
37	Canoe River
38	Kicking Horse River
39	Spillimacheen River
40	Skeena River**
41	Exchamsiks River**
42	Lakelse River**
43	Kitsumkalum River**
44	Zymoetz River** (Alias: "Copper River")
45	Kitsequecla River**
46	Bulkley River**
47	Kispiox River**
48	Babine River*
49	Sustut River**
50	Stikine River
51	Iskut River
52	Chutine River
53	Mess River
54	Tahltan River
55	Tuya River
56	Klastline River
57	Klappan River
58	Pitman River
59	Spatsizi River
60	Yukon Tagish River
61	Teslin River
62	Gladys River
63	Swift River
64	Jennings River
65	Takhini River
66	Tutshi River
67	Atlin River (and lake)
68	Fantail River
69	Wann River

70 Nass River**
71 Ishkheenickh River**
72 Kinskuch River**
73 Cranberry River**
74 White River**
75 Meziadin River - Strohn Creek**
76 Bell-Irving River**
77 Taylor River**
78 Damdochax Creek**
79 Muskaboo Creek** (Alias: "Muckaboo Creek")

80 Taku River
81 Tulsequah River
82 King Salmon River
83 Nahina River
84 Yeth River
85 Sutlahine River
86 Kawatua River
87 Nahlin River
88 Samotua River
89 Hachett River

90 South Coast Rivers (South of Cape Caution)
91 Central Coast Rivers (Cape Caution north to Lambert Point at mouth of Skeena River)
92 Vancouver Island East**
93 Vancouver Island West
94 Graham Island**
95 Moresby Island**
96 North Coastal Rivers* (North of Gust Point at mouth of Skeena River)
97 Central Coast Islands
98 Alsek River

APPENDIX IV

Guidelines for Assessing Physical and Biological Limitations to Recreational Use

Table 1 presents general guidelines which can be used to determine levels or classes of biophysical limitations as described in Chapter Four of this manual. The limitations described are applied to a wide range of recreational uses and as such the potentially troublesome conditions are usually those which limit intensive recreational use. The purpose of presenting these guidelines is to provide a means of assessing the physical and biological limitations of the landscape as they apply to outdoor recreation use.

Should a map describing biophysical limitations to recreation use be developed, the symbols suggested in Table 1 for the various limitations may be used on the map units. For land units, soil association map units can be used very effectively to subdivide an area of study. With this information as a hase, other possible limitations to recreational use can be assessed for each unit. For water courses, reaches determined in aquatic system inventories can be used as the basic stream or river unit.

Tables 2-8 present guidelines for assessing the physical limitations for specific recreational uses as well as facility developments that are often required in association with the provision of recreational opportunities. In using these tables it is important to be aware that the biological factors discussed in section 4.2 will also affect these specific uses and should also be considered.

The format used to present the tables is after Maynard, 1979. The conditions occurring between "optimal" and "troublesome" may be considered progressively more limiting to recreational use. Soil texture terms and drainage classes are according to the Canadian System of Soil Classification.

TABLE 1: GUIDELINES FOR ASSESSING PHYSICAL AND BIOLOGICAL LIMITATIONS TO OVERALL RECREATIONAL USE

Limitation	Suggested Map Symbol	Optimal Conditions*	Potentially Troublesome Conditions
SOIL			
Soil texture (texture classes may include 20-50% gravels)			
a) fine texture	S^f	loam	clay, sandy clay, silty clay, silt
b) coarse texture	S^c	sandy loam, fine sandy loam	sand, gravel
Coarse fragments >7 cm	S^b	<25% by volume in the surface 50 cm	>50% by volume in the surface 50 cm
Bedrock outcrops	S^r	<25% of the surface covered by bedrock	>50% of the surface covered by bedrock
Shallow soils			
a) shallow to bedrock	S^k	>1m to bedrock	<1m to bedrock
b) shallow to an impervious horizon	S^s	>1m	<1m
Soil drainage			
a) soil wetness	S^w	moderately well drained	poorly and very poorly drained
b) soil dryness	S^m	well drained	very rapidly drained
Surface organic accumulation	S^o	<15 cm deep	>40 cm deep
GEOLOGICAL PROCESSES			
Snow avalanching	L^a	not occurring in the landscape	occurring in the landscape
Failing slope	L^f		
Gullying	L^g		
Wind erosion	L^d		
Karst	L^k		
Piping	L^p		
Periglacial	L^c		

* A limitation would not be indicated on a map unit if these conditions are present.

TABLE 1 (Continued)

Limitation	Suggested Map Symbol	Optimal Conditions	Potentially Troublesome Conditions
TOPOGRAPHIC EXPRESSION			
Simple slope	T^s	<10% slope	>30% slope
Complex slope	T^u	undulating to rolling multiple slopes of <10%	hilly multiple slopes of >30%
HYDROLOGIC			
Currents a) swimming/bathing	H^a	few or no safety problem exist; channel slope is 0-1% with a placid flow	unsuitable for bathing due to safety problems; channel slope is >3% with a rolling, broken or tumbling flow; waterfalls or chutes exist
b) canoes/kayaks	H^c	International River Classification Grades 1 and 2	International River Classification Grades 3, 4 and 5
Banks	H^e	easy access to the water; bank form is flat or at repose; <10% of the bank is vertical; texture is sand or gravel; no flood or side channels present	access to the water is difficult; the channel is entrenched and the bank is undercut; >50% of the bank is vertical; numerous flood or side channels are present
Flooding	H^i	no flooding hazard exists; in streams the channel form is confined and flood or side channels are absent; has a stable hydrologic response	severe flooding limitation; flooding may occur in response to limited rainstorms of overnight duration; area not accessible during spring melt or high rain periods; unconfined channel form with numerous side and flood channels and a flashy hydrologic response

TABLE 1 (Continued)

Limitation	Suggested Map Symbol	Optimal Conditions	Potentially Troublesome Conditions
Biological nuisance	H^b	no debris accumulation or aquatic plants; 0-15% bank overhang closure	much stable debris accumulation or some unstable; bank overhang closure >50%; many aquatic plants
Water quality	H^p	no evidence of water quality problems	water quality problems that restrict or prohibit use
FAUNAL			
Wildlife conflict	Y^c	not occurring	occurring
Wildlife hazard	Y^h		
VEGETATION			
Vegetation hazard/nuisance	V^h	crown coverage of hazardous species is <20%; distribution codes 1-5	crown coverage of hazardous species is >40% and is distributed as indicated by codes 7-9
Vegetation density	V^d	shrub layer crown cover <30% with a distribution code range of 1-4 and/or <3700 tree stems/hectare (>2m apart)	shrub layer crown cover >75% with a distribution code range of 6-9 and/or >25 000 stems/hectare (<0.6m apart)
Vegetation sensitivity	V^s	vegetation can withstand normal to intensive use; regeneration would not be considered difficult	vegetation is easily destroyed even by minimal use; regeneration is difficult if not impossible
CLIMATE	C	climate factors cause no hazard or do not affect recreational use	climatic factors causing problems for recreational use

TABLE 2: OPTIMAL AND POTENTIALLY TROUBLESOME CONDITIONS FOR CAMPSITE AND PICNIC AREAS*

Item Affecting Use	Optimal Conditions	Potentially Troublesome Conditions
Soil drainage	well and moderately well drained	poorly and very poorly drained
Surface soil texture	loam, sandy loam	clay, silty clay, silt, sandy clay, organic soils, loose sand or soils subject to blowing
Permeability	very rapid to moderate, no surface ponding	slow and very slow, surface ponding
Surface stoniness (fragments >15 cm in diameter)	nonstony to slightly stony, surface stones cover <0.1% of the area	exceedingly or excessively stony where greater than 15% of the surface area is covered
Rock outcrop	nonrocky, bedrock exposures cover <2% of the surface	very rocky to excessively rock, where bedrock exposures cover >25% of the surface area
Slope	<8%	>15%
Flooding	none during season of use	subject to flooding during season of use

* Adapted from Montgomery and Edminster, 1966

TABLE 3: OPTIMAL AND POTENTIALLY TROUBLESOME CONDITIONS FOR PLAYGROUNDS*

Item Affecting Use	Optimal Conditions	Potentially Troublesome Conditions
Soil drainage	well and moderately well drained	imperfectly to very poorly drained soils or soils subject to seepage during season of use
Surface soil texture	sandy loam, loam	sandy clay, clay, silty clay, silt, organic soils and sand or loose soils subject to blowing
Slope	<2%	>8%
Permeability	rapid to moderate with no surface ponding	slow and very slow, surface ponding
Flooding	none during season of use	subject to flooding during season of use
Depth to bedrock	>1m	<1m
Surface stoniness (fragments >15 cm)	nonstony to slightly stony, surface stones cover <0.1% of the area	exceedingly or excessively stony, >15% of the area is covered by surface stones
Bedrock outcrop	nonrocky, bedrock covers <2% surface	moderately rocky to exceedingly rocky, bedrock outcrops cover >10% surface area

* Adapted from Montgomery and Edminister, 1966

TABLE 4: OPTIMAL AND TROUBLESOME CONDITIONS FOR PATH AND TRAIL DEVELOPMENT*

Item Affecting Use[1]	Optimal Conditions	Potentially Troublesome Conditions
Textural Class[2]	sandy loam, fine sandy loam, very fine sandy loam, loam	sand, sandy clay, silty clay, clay, organic soils
Gravel Content[3]	0-50%	not applicable
Cobble Content[4]	0-20%	>50%
Stoniness[5]	stones >2 m apart and covering <3 m of surface	stones <1 m apart and covering >15% of surface
Wetness[6]	Rapidly, well and moderately well drained soils. Water table below 50 cm during season of use.	Poorly and very poorly drained soils. Water table above 50 cm and often near the surface for a month or more during season of use.
Rockiness[6]	R0, R1[8]. Rock outcrops cover <10% of the area	R3-R5[8]. Rock outcrops cover >25% of the area
Slope[7]	0-15%	>30%
Flooding	none	Frequent. Floods annually or semi-annually.

[1] The items listed in this table are those which have been shown to cause significant differences in trail response. Elevation, aspect, slope position and snow avalanching may also have slight effects on trail management and should be considered in the final site evaluation. Items such as vegetation, fauna and scenic values are not considered.

[2] Texture refers to the soil texture which will form the tread texture. This is the surface texture on level areas but may be a subsurface texture on slopes. Textural classes are based on the less than 2 mm soil fraction (Canadian System of Soil Classification for Canada, 1974).

[3] Gravel content refers to the percentage of gravel by volume which will be present in the trail tread (2 mm - 75 mm).

[4] Cobble content refers to the percentage of cobbles by volume which will be removed during trail construction (75 - 250 mm).

[5] Stoniness refers to coarse fragments >25 cm (250 mm).

[6] See definitions for drainage and rockiness classes in the System of Soil Classification for Canada (CSSC, 1974).

[7] Slope refers to the slope of the ground surface not of the trail tread.

[8] The type of rock outcrop (flat lying vs cliffs), and the orientation of the structure with a rockiness limitation based on the percent rock outcrops above, should be evaluated on its own merits and the degree of limitation should then be modified appropriately if necessary.

* adapted from P. Epp, 1977. Guidelines for Assessing Soil Limitations for Trails in the Southern Canadian Rockies.

TABLE 5: PHYSICAL REQUIREMENTS AND LIMITATIONS FOR FOUNDATIONS OF LOW-RISE DWELLINGS*

Optimal Conditions	Potentially Troublesome Conditions
Very rapidly to well drained soil, good surface or subsurface drainage.	Poorly and very poorly drained soils, water table within 0.5 m of the surface, restricted subsurface drainage, seasonal ponding, seepage sites.
Minor or no bedrock outcrops, bedrock generally below 1 m of the surface.	Bedrock within 0.5 m of the surface over a substantial portion of the area.
Slope less than 15%	Slopes in excess of 25%, depressional areas, toe-slopes.
Preconsolidated sediments; low volume change potential, low degree of frost susceptibility, Unified textures GW,GP,SW,SP,GM,GC,SM,SC.	High compressibility, plastic silts and clays, high volume change potential, high degree of frost susceptibility, Unified textures MH,CH, OL,OH,Pt, sediments containing large boulders.
Good subsurface drainage, high bearing strength materials at depth.	Compressible, low strength sediments at depth, impervious layer or water table near a level or gently sloping ground surface.
	Permafrost, periglacial processes.

* After Maynard, 1979.

TABLE 6: PHYSICAL REQUIREMENTS AND LIMITATIONS FOR ROAD AND STREET SUBGRADE*

Optimal Conditions	Potentially Troublesome Conditions
Very rapidly to moderately well-drained soils, good subsurface drainage	Poorly and very poorly drained soils, surface and near-surface runoff is the main form of downslope drainage, water table or impervious layer within 0.5 m of a depressional or level ground surface, seasonal ponding
Bedrock more than 1 m below the surface, in undulating or steeply sloping areas, bedrock should be greater than 2 to 3 m deep.	Bedrock within 0.5 m of the surface over a substantial portion of the area.
Slope less than 10%	Slopes greater than 20%, undulating topography, poorly drained depressional areas, toe-slopes.
Granular sediments with good subsurface drainage and low volume change and frost action potential (GW,GP,SW,SP), if frost action is not a consideration, silty granular sediments (GM,SM) are good.	High plasticity silts and clays (MH,CH), organic clays (OL,OH), and peat (Pt), high volume change and frost susceptible sediments, low permeability sediments; large boulders.
No restrictions to subsurface flow within 2 m of the surface.	Restrictions to subsurface drainage within 1 m of the ground surface.
	Permafrost, periglacial processes.

* After Maynard, 1979.

TABLE 7: PHYSICAL REQUIREMENTS AND LIMITATIONS FOR SEPTIC TANK FILTER FIELDS*

Optimal Conditions	Potentially Troublesome Conditions
Well to moderately well drained soils, water table more than 2 m below the surface, depth to impervious layer more than 3 m, surficial materials with medium permeability little surface and near-surface runoff.	Rapidly, very rapidly, poorly, and very poorly drained soils, water table or impervious layer within 2 m of the surface, highly to very highly permeable surficial sediments, large amount of surface and near-surface runoff.
Bedrock more than 3 m below the surface	Bedrock within 2 m of the surface; limestone bedrock with cavities or highly fractured bedrock.
Slope less than 10%	Slope greater than 15%, depressional areas and toe-slopes.
Unified textures: SP,SW,SM,SC, with medium permeabilities.	Unified textures: GW,GP,SW,SP may be too permeable, cemented granular sediments (GM,GC, SM,SC) may have low permeabilities, CL,CM,ML and MH sediments are usually relatively impermeable, OL,OH and Pt sediments are water absorbant with poor internal drainage, a large proportion of boulders, sediments with high volume change potential.
No restrictions to subsurface flow within 3 m of the surface.	Highly permeable sediments or bedrock within 2 m, impervious material or water table within 2 m of the surface.
	Permafrost, periglacial processes.

* After Maynard, 1979.

TABLE 8: ASSESSING SOIL CAPABILITY AS A SOURCE OF TOPSOIL*

Item Affecting Use	Optimal Conditions	Potentially Troublesome Conditions
Soil drainage	any drainage class better than poorly drained	poorly and very poorly drained soils
Slope	<8%	>15%
Flooding	none	frequent flooding or constantly flooded
Surface stoniness	nonstony soil surface	soil surface covered with more than 10% stones
Surface soil texture	sandy loam, very fine sandy loam, fine sandy loam, loam, silt loam	loamy sand, sand, sandy clay, silty clay, clay, silt, organic soils
Thickness of the surface soil horizon (Ah horizon)	>15 cm	<8 cm
Salinity of topsoil	electrical conductivity of <1	electrical conductivity >3
Organic matter content of the Ah if present or solum average if not present	>15%	<5%
Consistence of topsoil	friable and very friable	very firm or extremely firm
Depth of solum (A & B) horizons	>75 cm	<40 cm
pH of Ah if present or solum average if not	6.5 - 7.5	<5.0 or >8.0
Coarse fragments in the surface Ah if present or solum average if not	<3% by volume	>15% by volume

* Adapted from U.S.D.A., 1971 and Maynard, 1977

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APPENDIX V

Interpretation of CLI Recreation Capability Maps

Reconnaissance level recreation capability mapping under the Canada Land Inventory program was completed for the CLI area within British Columbia in 1972. This was the first inventory of this nature carried out in Canada. Although the CLI program has been completed, for many areas of B.C. these are the only standardized outdoor recreation inventory maps available. With the knowledge that the CLI recreation capability maps continue to receive regular use, this appendix was included in this manual to provide a description of the CLI system with particular emphasis on its application in B.C. It is hoped that this information, as well as that contained in the manual The Canada Land Inventory - Land Capability Classification for Outdoor Recreation will ensure that the CLI maps are properly interpreted by the user.

The CLI system of recreation classification had seven capability classes, the basis of the classification being "the quantity of recreation which may be generated and sustained per unit area of land per year under perfect market conditions". Ranking is based on the relative capability of each land unit to attract and accommodate numbers of recreationists. A major difficulty with this system results from using one class number to average the differences between a unit's ability to attract and its capability to sustain use. For instance, an alpine area may have high ability to attract, but have low capability to sustain recreation use.

With the presence of both numerical classes and features symbols on the CLI maps, users often make the mistake that the numerical capability class rating is the most significant aspect of any unit. This leads to the conclusion that "quality recreation areas" are ignored. Proper consideration of the feature symbols of each unit will reveal that quality areas such as unique landscapes, attractive vegetation and special habitats are identified on the CLI recreation capability maps.

For any capability unit, recreation features are rarely found in isolation but grouped into an association of features. While many features tend to support one another a few compete and are incompatible if together in the same unit. For example, in shoreland units, both cottaging and camping capability may be high but it is difficult to reconcile both uses along the same unit of shoreline. CLI mapping would reflect this incompatability by discouraging the use of both features in the same unit. When both N (cottaging) and K (camping) capabilities are high, K was the feature normally recorded; it indicates a higher intensity of use, is less tolerant to topographic and soil limitations and is more limited in occurrence than N.

Judgement had to be exercised in "selecting" features for some areas. In certain instances, it was wise to avoid the use of the Y (boating) feature on smaller lakes where its capability is rarely high; values of wetland wildlife, canoeing, fishing and solitude may be downgraded by power boating. Similarly, care was used in application of the J (gathering and collecting) feature. Certain floral communities may have high capability for gathering and collecting in the short term but such activity might eventually destroy the attraction.

Guidelines as set forth in the national CLI Recreation Capability Manual are adequate and were followed for most features in British Columbia. Instead of going through all the features, a few of them will be discussed to give an idea as to how they were used.

VEGETATION

E. Vegetation - land with significant vegetation.

In British Columbia the E feature symbol was used to cover a very broad range of vegetative types. Similar to U, the E feature symbol is used to cover more than one definable feature; it has four major applications.

a. Unique Vegetation - relatively rare or unique floral communities which lend themselves to interpretation or viewing experience warranted a high capability class. Such vegetation was defined on capability maps by the occurrence of the E feature symbol as the dominant feature in Classes 2 and 3. Examples: Cathedral Grove mature Douglas-fir (2U E), native Rhododendrons, Manning Park (3U EAV).

b. Attractive Vegetation - certain extensive vegetative types have recreation attraction. Yellow pine-grassland and Douglas-fir-parkland are aesthetically appealing, easy to travel through and frequently are associated with high numbers of varied wildlife. Depending upon terrain and the occurrence of other features, these areas were defined by secondary occurrence of the E symbol in classes 3 and 5 or primary and secondary occurrence of the E symbol in class 4. Examples: Tobacco Plains (4U EQO), Okanagan "desert" (4UEVQ) Okanagan pine-fir sidehills (5U OVE).

c. Alpine Meadow - Alpine meadow was designated similarly to "attractive vegetation" although it may have also been recorded as primary or secondary E feature in Class 3 and secondary feature in Class 2 (rarely Class 1). Examples: Lake Magog, Mount Assiniboine (1S VEQ), Top of the World (2U VQE), alpine lake north of Whiteswan (3U EVA), alpine basin with small tarns (4U EVM) small alpine basins (5U EVQ).

d. Cover Description - as a secondary feature in Class 5 or lower, the E feature symbol was used to describe a positive condition of the land unit (i.e. has forest cover or capability for same) but does not indicate a special attraction of vegetation. It was used in the very extensive 6U QE designation of forested mountain slopes. In local areas of relatively gentle topography the land may be rated 5U QE. In either instance the presence of vegetation did not affect capability rating.

CAMPING

K. Organized Camping - shoreland or upland associated with a recreation feature suited to organized tent or trailer camping.

Generally, camping was recorded on maps only when it was in association with other features such as viewing, gathering and collecting, angling, boating, or bathing beach, etc. Essential requirements for organized camping are: level, stable, well drained and unconsolidated surface materials capable of supporting tree growth and close to potable water.

The K feature symbol occurred in Class 1 or 2 usually as a secondary feature to bathing beach or other feature of high capability. Camping as a dominant feature will invariably be indicated either along a lake or stream shore, particularly on fans and terraces which are landforms best suited for camping capability. Classification of K as a dominant feature was usually restricted to class 3 or lower. The following guidelines were followed in the use of the K feature symbol.

a. The K feature usually was indicated in Class 1 or 2 only as secondary feature.

b. Fans on lakes with capablity for boating, angling, bathing and/or viewing warranted a rating of Class 3 or 4 with K the dominant feature symbol.

c. Ideal conditions for camping along streams and rivers rarely warranted rating above Class 4 with the K feature symbol dominant.

d. Generally, occurrence of the K symbol in class 5 or 6 indicated opportunities for primitive camping. These are areas with limitations of topography, soils and/or climate or a lack of associated recreation features required for organized camping.

ROCK, LANDFORM, LANDSCAPE FEATURES

The feature symbols, L (Landform), Q (Topographic Patterns), and R (Rock Formations), were defined for use in CLI recreation capability mapping. They are more or less related to each other and there has been confusion in distinguishing between them. The following gives a brief definition with examples of application of each of these features.

L - Landforms - areas containing natural landform features other than rock formations.

Classification of landforms ranged from Class 2 to Class 6 depending upon the degree of viewing experience and opportunity for interpretation. Examples include: Dutch Creek Hoodoos (2U LA), canyon and falls on lower Elk River (3U LFZ), Fraser Canyon at Sawmill Creek (3U HPL), canyon on Wigwam River, East Kootenay (4U LVA), Horn of Mount Assiniboine (5U LVG), extensive areas of sculptured peaks in Rocky Mountains (5U GLV), extensive areas of peaks and glaciers in Purcell Mountains (6U GVL). Other phenomena which may have been defined by the L feature symbol include: sand dunes, eskers, drumlins, and slump zones.

O - Topographic Patterns - patterns of topography and landform or land and water exhibiting diversity of natural landscape.

Classification of the Q feature symbol as a dominant feature was restricted to class 4 or lower. It indicates:

a. land having a high degree of aesthetic attractiveness (Class 4), e.g. floor of Rocky Mountain Trench (4U QOE).
b. a condition of relatively gentle terrain suited to a dispersed activity such as riding or hiking (Class 5), e.g. small upland basin with ponds (5U QM).
c. a positive condition of rugged terrain suited to limited extensive activity but adding to the aesthetics or adjacent units (Class 6), e.g.

As a secondary feature, the Q symbol may have occurred in any class to indicate diversity of landscape.

Examples: Top of the World (2U VQE), Mount Assiniboine meadows (3U VEQ), upper Elk River valley (4U VQE).

R - Rock Formations - rock and rock formations or associated geological or erosional phenomena.

Classification of the R feature symbol was mostly as a primary feature in generally small site specific units from Class 1 to Class 5. Rock features described by this feature symbol include exposed stratification, caves, crevasses, arches, wave cut areas, lava flows, columnar basalts. Classification was related to viewing experience, opportunities for interpretation and association with other recreation features. Examples include: west coast Vancouver Island (IS BKR, 3S RBH), rock cliffs and petroglyphs on Harrison Lake (2S HRV), rock shore of Texada Island (4S RAN), Cody Caves (2U RQ), Arrow Lake natural rock arch (3S RVU), Bridge River rock cliffs and rock-hound area (3U RJV), fossil bed near Cranbrook (3U RJQ), exposed stratification south of Fernie (6U RQE).

Following is a table which provides a summary description of the CLI recreation feature symbols and specific examples of the uses of class 1 to class 5 categories for each feature.

TABLE 1
BRITISH COLUMBIA SUMMARY
CLI RECREATION CAPABILITY CLASSIFICATION

FEATURE	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
A - Angling Land providing access to water with natural capability for harvesting and/or viewing of sport fish. The most common use of the A feature symbol is as a secondary feature in association with other shore features.	Excellent opportunities to view and angle anadromous fish runs. Eg. Moricetown and Adams River.		Excellent fishing. Eg. Cowichan Bay.	Good fishing. Eg. Shuswap Lake.	Good fishing with access limitation or small boat hazard. Eg. Portland Inlet.
B - Beach Shoreland capable of supporting beach activities such as family bathing, swimming, sun-bathing, paddling, camping, gathering and collecting, viewing, boating and water skiing.	Excellent warm water beach.	As primary feature, excellent warm water beach. As secondary feature, limited swimming use.	As primary feature, good swimming opportunities.	As primary feature, some swimming opportunities.	
	See detailed criteria for Beach feature in National Manual. In British Columbia less emphasis has been placed on water temperature as a requirement for use of the B feature. High classification for B has been given for many marine beaches such as Long Beach and for some beaches on large, scenic interior lakes such as Chilko, Kootenay and Quesnel Lakes where swimming is not main activity but use is intense.				
C - Canoe Tripping Land fronting waterways with capability for canoe tripping; not "white water" sports. The C feature symbol is most often used as a secondary feature to viewing, angling, or camping.			Excellent canoeing. Eg. Bowron Lakes.	Good canoeing. Eg. Crooked River.	Moderate canoeing. Eg. upper Fraser River.
E - Vegetation Land with significant vegetation.	Use of E feature symbol in classes 1, 2 or 3 indicates outstanding floristic communities. Eg., mature forest at Cathedral Grove, outstanding alpine at Mount Assiniboine, unique flora such as Manning Park rhododendrons.			Use of E feature symbol in lower classes indicates vegetative patterns varying in their attractiveness for extensive recreational use. See Landscape Description.	
F - Waterfalls & Rapids Classification is on the basis of water volume, height, setting, development area.	Helmcken Falls	Hunlen Falls	Skookumchuck Narrows	Similkameen Falls	Small, temporary falls.

TABLE 1 (Cont'd)

FEATURE	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
G - Glacier Area offering opportunity to view or explore a glacier.	Excellent view of glacier and potential for exploration and interpretation. Eg. Bugaboo Glacier.		Good views of glacier but may lack support features and/or adequate development area. Frequent examples in Coast Mountains.		Extensive icefield and glacier with occasional view sites.
H - Historic Site and archeological sites.	Fort Steele, Barkerville.	Fort Langley, Kispiox.	Sandon, O'Keefe Ranch, pictograph sites, kickwillee holes.	Wild Horse Creek, unconfirmed or doubtful archeological sites.	
J - Gathering & Collecting Fruits, nuts, rocks, shells, minerals, fossils, shell fish, driftwood, artifacts.	Usually a subordinate feature. Difficult to assess how much gathering and collecting a site can sustain before deterioration of the resource. Example classifications: 2U RJ Driftwood Creek fossil bed; 3U HJV Yale gold panning, mineral and artifact collecting; 4S BJA Quesnel Lake arrowheads; 4S NJV Hornby Island shell fish and driftwood; 5U RJV Bridge River minerals.				
K - Organized Camping Level, well drained sites with tree cover, normally occuring on shorelands or along streams and in association with other recreation features such as angling, viewing, beach or boating.	As a feature in classes 1, 2 and 3 the K symbol designates excellent camping capability. It is invariably associated with shorelands or rivers on glaciofluvial, deltaic or coarse textured alluvial landforms.			As primary feature, good camping capability on small lakes and streams. As secondary feature, part of unit with good camping capability.	Small sites suited to primitive camping and picnicking. Organized camping capability limited.
L - Landforms Hoodoos, canyons, volcanoes, sand dunes, eskers, drumlins, mountain escarpments, (also see R - Rock Formations).	In classes 1, 2 and 3 L designates outstanding landforms for viewing and interpretation. Eg. 2U LA Dutch Creek hoodoos; 3U LVR dramatic sections of Fraser Canyon.			For use of L feature in lower classes see Landscape Description.	
M - Small Surface Waters Frequent small water bodies or small continuous streams.	For use of M feature see Landscape Description.				
N - Lodging Cottaging and recreational lodging, mostly on shorelands in association with angling, boating and beach activities.	Moderately sloping shorelands on marine coasts and large lakes permitting clustered development with access to beach with swimming and/or protected harbour for family boating and popular water sports.		No limitations to lodging, level to gently sloping backshore, easy access to beach or boating area, good boat launching potential.	Moderate limitation to lodging, steep foreshore, wind exposure, clustered development doubtful.	Some isolated lodging opportunities along steep or rocky shorelands.

TABLE 1 (Cont'd)

FEATURE	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
O - Upland Wildlife Areas offering hunting and wildlife observation opportunities primarily of wild ungulates, large carnivores and upland game birds.	Exceptional opportunities to observe wildlife such as at salt licks or on certain winter ranges featuring very high concentrations of animals. Eg. Chilcotin River sheep range.			Excellent hunting areas often featuring two or more game species.	Good hunting areas for one or two game species.
P - Cultural Landscape Patterns Lands exhibiting diversity of cultural landscape.	Interesting communities or cultural activities which offer viewing and interpretation opportunities such as coastal fishing villages, Indian fishing grounds and fur trading posts.			Attractive pastoral areas usually extensive in nature such as the lower Fraser Valley, Peace River area and Okanagan orchards.	
Q - Topographic Patterns Patterns of topography and landforms, or land and water, exhibiting diversity of natural landscape.	For use of Q feature see Landscape Description.				
R - Rock Formations Caves, exposed strata, wave eroded embankments, lava flows, mineral deposits, fossils, petrified wood, (also see L - Landforms).		Cody Caves	Arrow Lake rock arch.	Vaseux Lake rock bluffs.	See also Landscape Description.
T - Thermal Springs	Springs known to have a large, consistent volume of warm water capable of accomodating about 100 persons. Eg. 2S TKB Lakelse; 2S TBP Harrison Hotsprings.		Warm springs of small size, poor potential access or small development area. Eg. Lussier River.	Low volume or cool springs with limited potential. Many springs are classed low due to difficulty in obtaining accurate temperature and flow data.	
U - Deep Water Boating Area In British Columbia this feature symbol was used to designate deep water harbour areas and boat cruising waters on the ocean coasts and largest lakes.	Excellent, large, deep water harbours with large areas suited to cottaging, camping and marina development; near good fishing waters and providing protected small boating and moorage for large pleasure craft. Eg. Pender Harbour, Secret Cove.		Good deep water harbours of moderate size with potential for cottaging or camping and protected boat launching. Eg. Sechelt Inlet.	Small harbour suited mostly to temporary shelter for limited number of boats. Small marina facility potential.	Relatively exposed deep water suited to scenic boat cruising with larger pleasure craft. Eg. Bute Inlet.
			As secondary feature indicates deep boat cruising waters offshore; limited boat launching potential and hazards for small open craft.		

TABLE 1 (Cont'd)

FEATURE	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
V - Viewing A vantage point which provides a superior view, or an area which provides frequent good viewing opportunities.	For use of V feature see Landscape Description.				
W - Wetland Wildlife Waterfowl hunting areas as well as viewing shorebirds, fur bearers and marine mammals.		Hansen Lagoon, Boundary Bay.	Creston Marshes.	Boudreau Lake.	Upper Columbia River.
Y - Family Boating Relatively protected waters for family boating. Conditions suitable for small, open craft, potential for boat launching facilities.	Invariably used as a secondary feature in association with angling, cottaging and camping.				
Z - Man-made Features Major, non-urban man-made feature of recreational interest.	W.A.C. Bennett Dam.	Bull River fish hatchery.	Hazelton bridge, Highway #16.	Bridges and tunnels in Fraser River Canyon.	
S - Skiing Areas A combination of slopes, snow condition and climate providing downhill skiing opportunities during a normal season. The complexity of slopes and climate and lack of specific data has limited the identification of ski areas in B.C. Developed sites along with a few undeveloped prospects are shown on capability maps.	Vertical drop 2000 feet. Development area 100 acres.	Vertical drop 1000 feet. Development area 50 acres.	Vertical drop 500 feet. Development area 10 acres.	Vertical drop under 500 feet. Small development area.	Extensive areas with undulating terrain offering good cross country skiing and skidooing.
	Full range of slopes for beginner to advanced skier.		Beginner and novice slopes primarily.		
	In most cases concave slopes are desirable, tree cover is desirable, bedrock exposures are avoided, 150 inches seasonal snowfall is considered a minimum.				

REFERENCES

Department of Regional and Economic Expansion. 1969. The Canada Land Inventory - Land Capability Classification for Outdoor Recreation. Report No. 6. Ottawa.

APPENDIX VI

Outdoor Recreation Facilities and Land Designation Inventory

INTRODUCTION

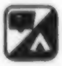
In a resource planning study, knowledge of the location and type of existing outdoor recreation facilities and land designations is often a valuable and complementary addition to outdoor recreation features and biophysical limitation information. In the collection and presentation of such data, the development of a standardized mapping procedure is of considerable value.

This appendix describes a method which can be used to graphically present outdoor recreation facilities and land designation information. Its basis is a system which was developed as part of the Canada Land Inventory program.

METHOD

The methodology which is used is such that it provides the flexibility to accomodate a range of inventory scales. Following are the components of the system.

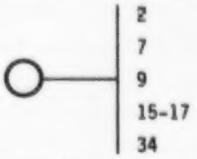
1. The use of the 1:250 000 map scale as a basic component (see Figure 1).
2. The use of smaller map scales if a summary map is being produced (usually as part of a report for a study area).
3. The use of larger map scales such as 1:50 000 for areas where greater detail or more precise location is required.
4. The use of symbols on the map to indicate the kind of facility present (see detailed list in the next section of this appendix).
   For example:



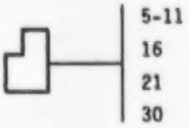
indicates a campground (private)

indicates a picnic area (Government)

5. A reference system which can be used, if desired, to identify a background data file that has been completed for a mapped facility or designation. This system would not be used on summary maps which are smaller scale than 1:250 000. The actual referencing system may vary depending on the scale of the inventory.
   Examples:
   92P-59 indicates facility number 59 within 1:250 000 mapsheet 92P
   92P-15-59 indicates facility number 59 within 1:50 000 mapsheet 92P-15
   In any case, the number which actually identifies the file (e.g. 59) is usually the only reference number that is indicated beside the facility symbol on the map.
6. A convention for complexing where grouped information is specifically desired or where cartographic limitations would cause congestion. For example:

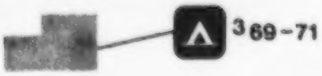


   indicates the data files of the facilities within the general map area defined by the circle.



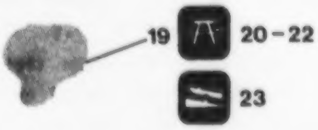
   indicates the data files of the facilities within an accurately defined map area such as an urban area or a park.
7. The use of index numbers with each facility symbol (where required) to indicate more than one facility of a specific kind at one location or within one designated area.

For example:



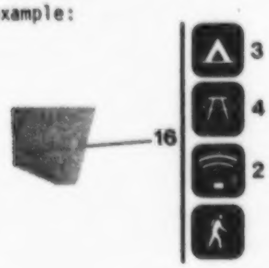
indicates three campgrounds within a provincial park area together with the data file numbers 69-71.

8. The use of data file numbers to indicate availability of information about facilities for which no symbol is assigned.
For example:



indicates a provincial park which contains three picnic grounds described on files 20-22 and one boat launching area described on file 23. Other information about the area is contained in file 19.

9. The use of index numbers to show the numbers of each kind of facility shown on one data file.
For example:



indicates a provincial park described on one data file; facilities within the park, and described on the file, include three campgrounds, four picnic grounds, two observation sites and one hiking trail. Other facilities descriptions and other information about the park may also be found on file 16.

OUTDOOR/INDOOR AND INDOOR FACILITIES

When carrying out a recreation facilities inventory, in addition to mapping outdoor recreation facilities it may also be desirable to map the location of outdoor/indoor (e.g. swimming pool) and indoor (e.g. rental cabins) recreation facilities and related services (e.g. hotels). If this is the case, they may be added as three separate categories with unique symbols identifying these facilities or services.

MAP SYMBOLS

Land Designations or Sites

Symbol	Type
▩	Provincial Park
▥	Recreation Area
⁘	Recreation Map Reserve
X	Forest Recreation Site (Ministry of Forests)
●	Roadside Rest Stop (Ministry of Transportation and Highways)
▤	Other Recreation/Facility Sites

Outdoor Recreation Facilities

Symbol	Type
Λ	Campground (Government)
◩	Campground (Private)
Π	Picnic Area (Government)
▣	Picnic Area (Private)
■	Serviced Beach
■	Boat Launching Area

Symbol	Type
⚓	Marina
▣	Observation Site, Viewpoint
⛷	Ski Hill
■	Playground
◎	Riding Stable or Rodeo Grounds
⛳	Golf Course
🚶	Hiking Trail
🏇	Horse Trail
⛷	X Country Ski Trail
■	Snowmobile Trail/Area
🏍	Trailbike Trail/Area
🚙	4 Wheel Drive Trail/Area
	Outdoor and Indoor
⬭	Ice Rink, Curling Rink
◉	Swimming Pool
◫	Tennis Courts
⊓	Spectator Facility/Sportsfield
	Indoor
⌂	Community Hall
∟	Bowling Lanes, Billiards
▢	Centre, Museum, Art Gallery

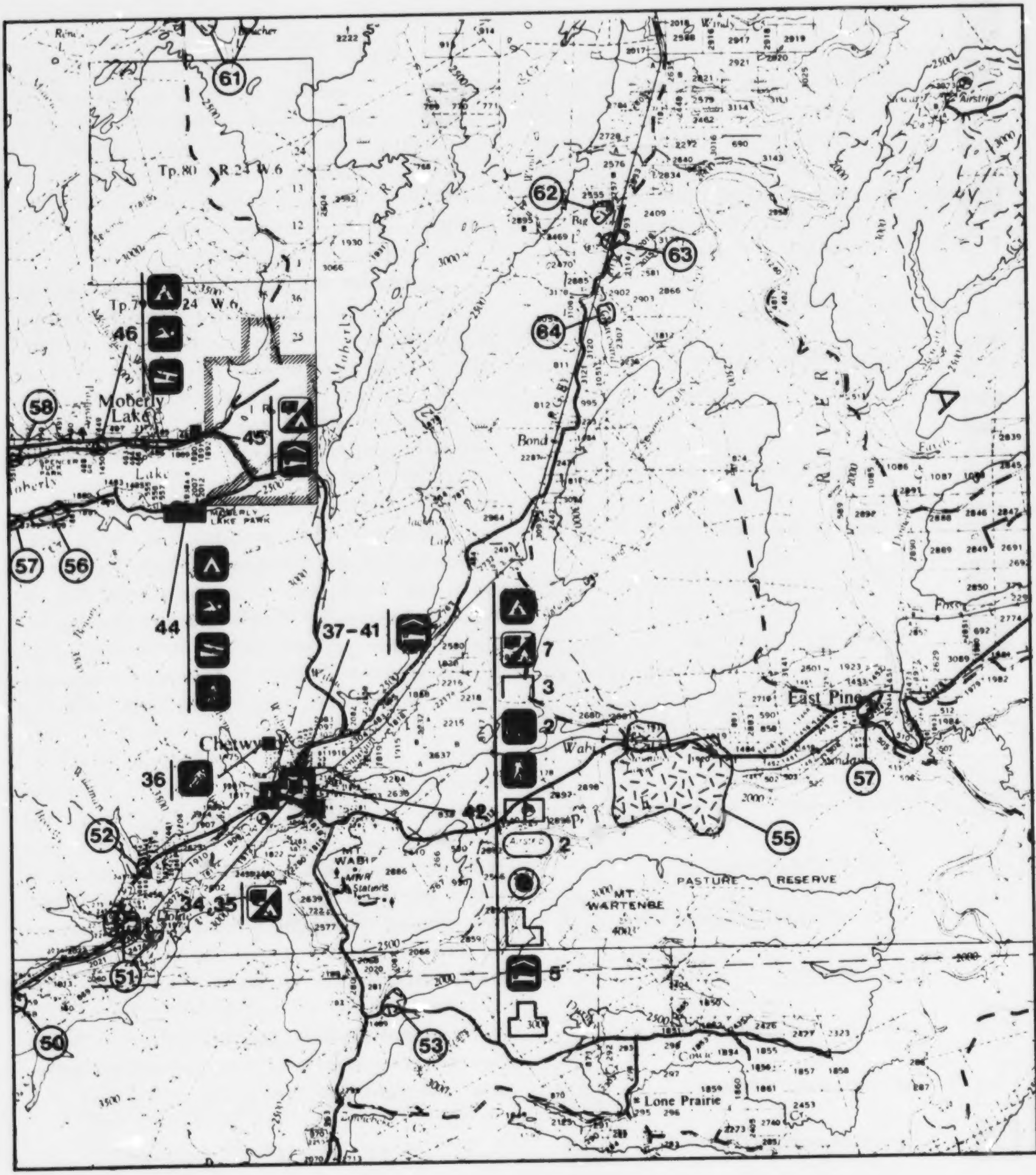
Symbol	Type
	Locations/Service Facility
🛏	Commercial Accomodation, Hotel, Motel, Lodge, Rental Cabins
⊥	Theatres

DATA FILE SYSTEMS

Considerable effort and money has been expended in B.C. on collecting detailed recreation/tourism facilities information and in developing systems, other than map formats, for storing and retrieving this information. To date, no satisfactory comprehensive system has been developed. One of the more recent projects which sought to accomplish this goal was the B.C. Recreation and Travel Facilities Inventory (B.C.R.A.T.F.I.). Although this inventory has suffered from a number of weaknesses, it is being used to collect specific types of recreation/tourism facilities information. The Ministry of Tourism keeps an inventory of travel related facilities and the Recreation and Fitness Branch of the Ministry of Provincial Secretary keeps an inventory of community recreation facilities, both using B.C.R.A.T.F.I.

More recently the Parks and Outdoor Recreation Division developed a detailed data file system for recording information on recreation trails (and water routes). This system which is still in a draft form was used on a trial basis in conjunction with a map inventory of trails on Vancouver Island. More detailed information on the procedures used can be obtained from the Outdoor Recreation Branch of the Parks and Outdoor Recreation Division.

If a comprehensive recreation facilities inventory system is considered to be desirable, further development work will have to occur.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5
Moberly Lake
MOBERLY LAKE PARK
Chetwynd
Tp.80 R.24 W.6
Tp.79 R.24 W.6
Bond
East Pine
MT. WABI
MT. WARTENBE
PASTURE RESERVE
Lone Prairie
Airstrip
Airstrip

FIGURE 1. EXAMPLE 1:250 000 RECREATION FACILITIES DESIGNATIONS

APPENDIX VII

The Recreation Opportunity Spectrum

INTRODUCTION

In the western United States, through the efforts of numerous individuals, a framework has been developed to assist outdoor recreation managers and policymakers answer questions concerning both the allocation and management of opportunities for recreation. This framework is built on the concept of the Recreation Opportunity Spectrum (ROS).

The following review of this concept is taken directly from the references listed at the end of this appendix, in particular The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research by Roger Clark and George Stankey. Those individuals interested in applying the ROS, which is undergoing a continuous process of refinement in the United States, should review in detail the most up-to-date literature available on the subject.

In addition to a description of the Recreation Opportunity Spectrum, a brief review is also provided of the relationship between the Outdoor Recreation Classification System described in this manual and the ROS.

RECREATION OPPORTUNITIES

When considering opportunities for outdoor recreation, people must make choices about: (1) activities in which to engage; (2) settings in which to recreate; and, (3) the kinds of recreation experiences to seek. A recreation opportunity setting (2) is the combination of physical, biological, social and managerial conditions that give value to a place. Thus such an opportunity includes qualities provided by nature (recreation features as described in Chapter Two) qualities associated with recreation use (levels and types of use) and conditions provided by management (developments, roads, regulations). By combining variations of these qualities and conditions, management can provide a variety of opportunities for recreationists, or in other words a recreation opportunity spectrum.

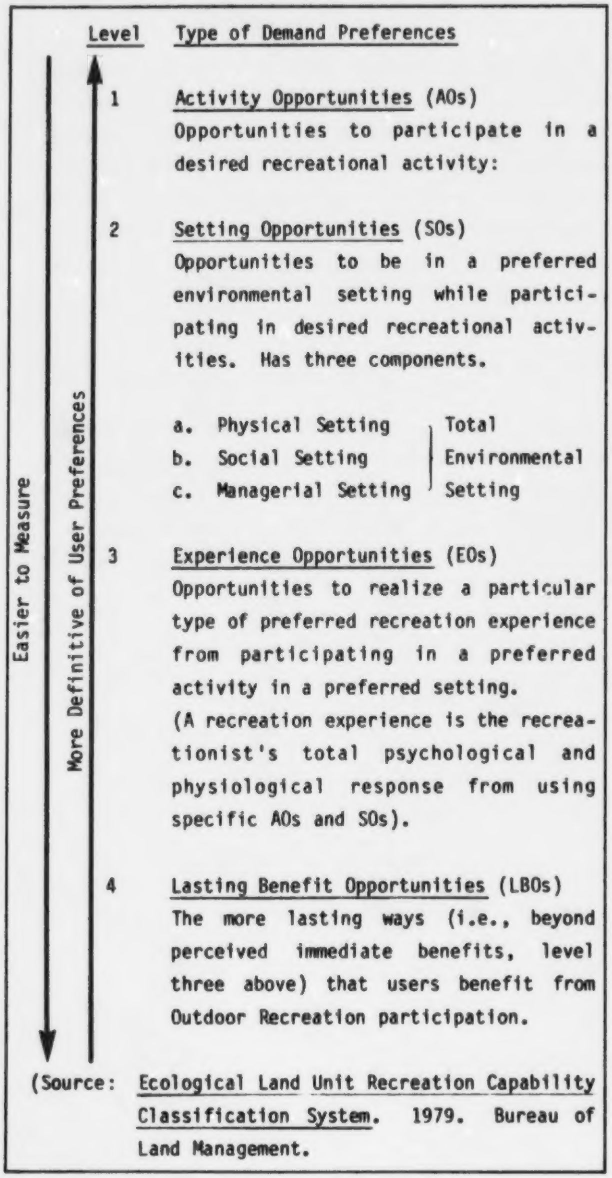
Failing to provide diversity of opportunity invites charges of favouritism or mis-management. Further, diversity insures the flexibility necessary to mitigate changes or disturbances in the recreation system stemming from such factors as social change (changing age structure of our population) or technological change (design of outdoor recreation vehicles, etc.).

CONCEPTUAL FRAMEWORK

Recognition of the multi-dimensional nature of user preferences for recreation opportunities has resulted in formulation of a Recreation Demand Hierarchy concept consisting of four components. Figure 1 illustrates this concept more specifically.

FIGURE 1

RECREATION DEMAND HIERARCHY



Level	Type of Demand Preferences
1	Activity Opportunities (AOs) Opportunities to participate in a desired recreational activity:
2	Setting Opportunities (SOs) Opportunities to be in a preferred environmental setting while participating in desired recreational activities. Has three components. a. Physical Setting b. Social Setting c. Managerial Setting Total Environmental Setting
3	Experience Opportunities (EOs) Opportunities to realize a particular type of preferred recreation experience from participating in a preferred activity in a preferred setting. (A recreation experience is the recreationist's total psychological and physiological response from using specific AOs and SOs).
4	Lasting Benefit Opportunities (LBOs) The more lasting ways (i.e., beyond perceived immediate benefits, level three above) that users benefit from Outdoor Recreation participation.

(Source: Ecological Land Unit Recreation Capability Classification System. 1979. Bureau of Land Management.

ACTIVITY OPPORTUNITIES

The outdoor recreation inventory system described in this manual provides a means of determining opportunities available to participate in a desired recreational activity.

SETTING OPPORTUNITIES

In addition to the occurrence of recreation features, six factors have been delineated as a result of research and management experience which define setting opportunities:

1. access
2. other non-recreational resource uses
3. On-site management
4. social interaction
5. Acceptability of visitor impacts, and
6. Acceptable level of regimentation

Access

The types of access (e.g., trails, roads, highways) and means of access (foot, all-terrain vehicle, car) can be controlled. In addition, natural features of the landscape such as topography and vegetation density have a direct affect on ease of access. Finally, use regulations such as closing areas to all-terrain vehicle use can affect user access to an area.

Non-Recreational Resource Uses

This factor considers the extent to which non-recreational resource uses (grazing, mining, logging) are compatible with various outdoor recreation opportunities.

On-Site Management

The on-site management factor includes site modifications, such as facilities, exotic species of vegetation, vegetation management, landscaping, traffic barriers, etc.

Social Interaction

The appropriate amount of social interaction is an important characteristic of different recreational opportunities. The level of use beyond which crowding occurs varies by expectations of visitors and the extent to which interaction levels are perceived as appropriate. In addition to the level of interaction attention must also be given to the type of use appropriate for each setting and type of interactions (e.g., snowmobiler with cross-country skier) which are acceptable.

Acceptability of Visitor Impacts

Any use creates some impact; thus the relevant question is not "how can use be prevented" but "what level of impact is consistent with the type of opportunity being supplied"? Thus, damage or a level of impact necessitating correction by management occurs only when the impact exceeds the magnitude defined in area management plans as an appropriate level for an opportunity area.

Acceptable Regimentation

The nature, extent, and level of control over recreational use is an important factor characterizing different opportunities. Specific techniques which can be used for regimenting recreationists activities are legislation, rules, regulations and site design.

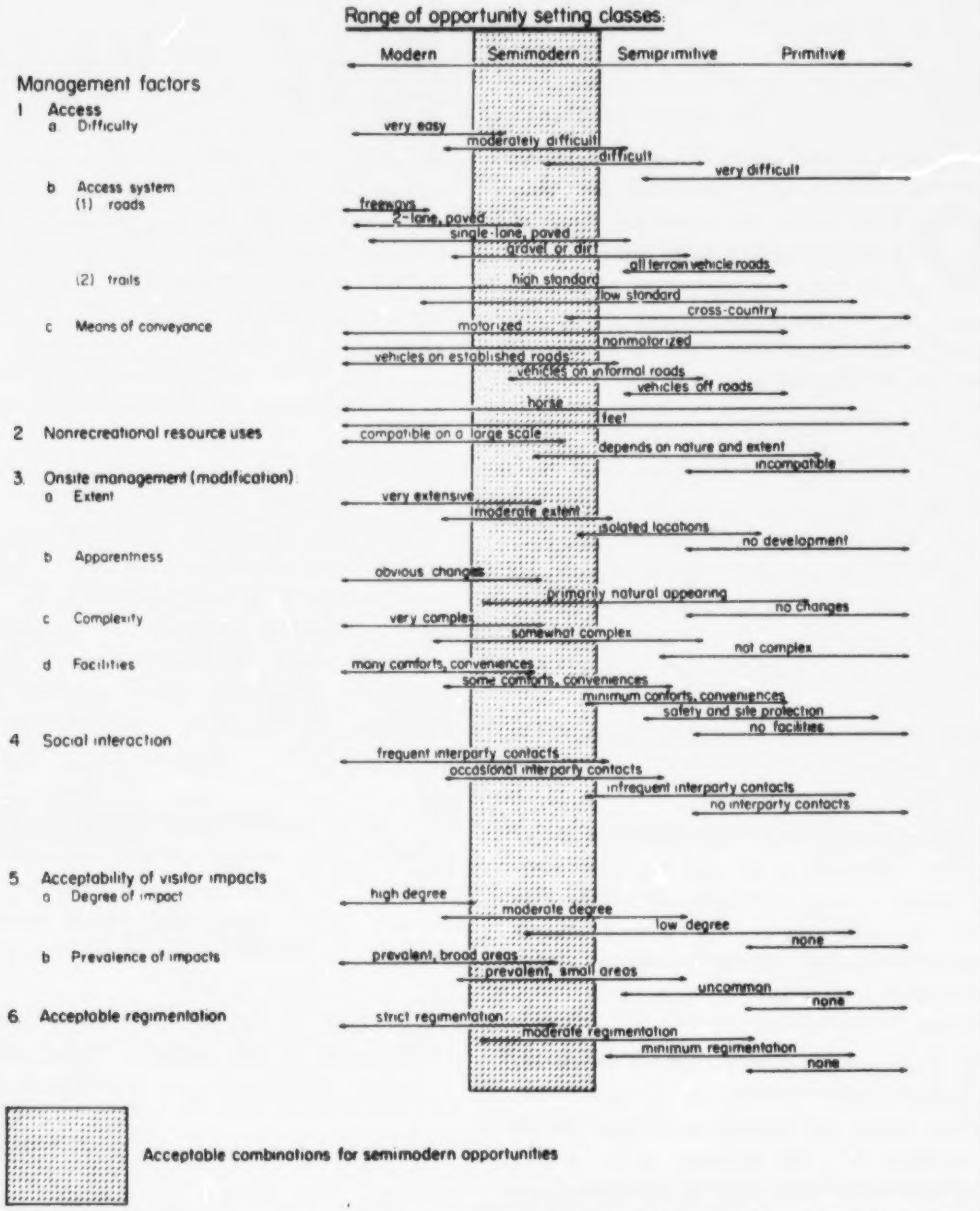
COMBINATIONS OF FACTORS AND THE RECREATIONAL OPPORTUNITY SPECTRUM

A recreation opportunity setting is the result of a specific combination of the six previously described factors in a particular location. An example of recreation opportunity setting classes which have been defined in the recreation opportunity spectrum are described in Figure 2.

There are no obvious points at which boundaries for the different opportunities can be established. Any number of categories could be substituted across the top of Figure 2. The important point is that the type of setting is determined by the combination of factors, rather than the name or number of the categories.

APPLICATION

By using both the Activity Opportunity and Setting Opportunity classification systems concurrently, and applying them to both on-the-ground resources (supply) and to user preferences (demand) differences between the two (need) can be described. These inventories, evaluations and analyses consider both qualitative and quantitative differences. By either maintaining or changing the six setting opportunity factors and/or recreational features and carrying capacity limitations to provide recreation opportunities that are either desired or expected, planners and managers can reconcile these differences.


Range of opportunity setting classes:
Modern
Semimodern
Semiprimitive
Primitive
Management factors
1 Access
a Difficulty
very easy
moderately difficult
difficult
very difficult
b Access system
(1) roads
freeways
2-lane, paved
single-lane, paved
gravel or dirt
all terrain vehicle roads
(2) trails
high standard
low standard
cross-country
c Means of conveyance
motorized
nonmotorized
vehicles on established roads
vehicles on informal roads
vehicles off roads
horse
feet
2 Nonrecreational resource uses
compatible on a large scale
depends on nature and extent
incompatible
3. Onsite management (modification)
a Extent
very extensive
moderate extent
isolated locations
no development
b Apparentness
obvious changes
primarily natural appearing
no changes
c Complexity
very complex
somewhat complex
not complex
d Facilities
many comforts, conveniences
some comforts, conveniences
minimum comforts, conveniences
safety and site protection
no facilities
4 Social interaction
frequent interparty contacts
occasional interparty contacts
infrequent interparty contacts
no interparty contacts
5 Acceptability of visitor impacts
a Degree of impact
high degree
moderate degree
low degree
none
b Prevalence of impacts
prevalent, broad areas
prevalent, small areas
uncommon
none
6 Acceptable regimentation
strict regimentation
moderate regimentation
minimum regimentation
none
Acceptable combinations for semimodern opportunities

(Source: The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research, 1979).

FIGURE 2. FACTORS DEFINING OUTDOOR RECREATION OPPORTUNITY SETTINGS

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Brown, P.J., B.L. Driver and C. Mcdonnell. 1978. *The Opportunity Spectrum Concept and Behavioural Information by Outdoor Recreation Resource Supply Inventories: Background and Application.* In: *Integrated Inventories of Renewable Natural Resources: Proceedings of the Workshop.* Rocky Mountain Forest and Range Experiment Station. U.S. Forest Service, Fort Collins, Colorado.

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APPENDIX VIII

Glossary of Terms

Following are definitions of key terms which should be familiar to those involved in an outdoor recreation inventory. Some of these definitions, as well as numerous others, are also provided in the chapters and the other appendices of this manual.

ACTIVITY (OUTDOOR RECREATION)
Activities in an environment where the significant factors contributing to the opportunity for activity are normally natural as opposed to man-made.

BIOPHYSICAL LAND CLASSIFICATION
This expression refers to the Assessment and Planning Division's overall land classification system for describing and mapping climate, terrain, soils, vegetation, aquatic resources, wildlife resources, outdoor recreation resources and visual resources. This approach to land description is in the formative stages.

BIOPHYSICAL LIMITATION (TO OUTDOOR RECREATION)
Natural landscape elements which determine the inherent ability of land and water units to sustain recreational use, as determined through the evaluation of a broad range of biophysical criteria such as soil texture, soil depth, drainage, surface processes, topography, water body characteristics, vegetation, and fish and wildlife resources.

BIOPHYSICAL LIMITATION MAP UNIT
An area of land or water which is composed of a discrete combination of natural elements (soil texture, topography etc.) which, from an inventory point-of-view, exhibit a uniform ability to sustain recreational use.

BIOPHYSICAL SOIL CLASSIFICATION
This system involves the identification, description and mapping at a regional reconnaissance scale of "biophysical soil association components", these land units being differentiated on the basis of geology, terrain, climate, forest zone and soil development. The classification may be used as a basis for interpretations respecting: (i) land capability for agriculture, forestry, wildlife and outdoor recreation; and (ii) land suitability for urban, industrial and transportation development.

BIOPHYSICAL TYPE
Defined by combining vegetation type with soil association component. Where more than one vegetation type occurs on a single soil association component, complexes of vegetation types are indicated.

CAPABILITY CLASS
A rating which indicates the general suitability of a soil or tract of land for a particular resource use. The Canada Land Inventory has developed capability classifications for agricultural, forestry, wildlife and recreational uses of land. For each of these classifications, the biophysical limitations or hazards for resource use become progressively greater from Class 1 (no constraints) to Class 7 (resource use precluded).

CONCENTRATED RECREATION USE
A relative term referring to a high level of use in terms of visitor-days per unit area per annum; or a type of recreational activity usually requiring a relatively small land area per person.

DISPERSED RECREATION ACTIVITY
Any of those recreational activities which either:

a. have a high acreage requirement per person or family participating at any particular time for optimum user satisfaction, e.g. fishing and hunting; or
b. are highly tolerant in resource requirements and can therefore be enjoyed in a wide range of land types, e.g. picnicking and walking.

FACILITY (OUTDOOR RECREATION)
Man-made structures (picnic sites, campsites) or land improvements (hiking trails, observation point) which facilitate visitors' use of outdoor recreation features.

PARENT MATERIAL
The unaltered or essentially unaltered mineral and/or organic material from which a soil develops through the operation of soil-forming processes.

PEDOLOGY
That part of soil science which deals with the origin, morphology, genesis, distribution and classification of soils.

PHYSIOGRAPHIC REGION
A track of land of similar geological structure and climate which has experienced a unified physical (geomorphological) history.

REACH (STREAM REACH)

The basic biophysical mapping unit of the aquatic systems inventory. The reach is characterized by relatively homogeneous properties which will vary according to the scale of the survey, and which include slope, channel and/or biological parameters.

RECREATION FEATURE

Any aspect of a land or water unit which provides an opportunity for outdoor recreation. For example, such opportunity could be provided by the presence of biotic features (such as fish, wildlife or vegetation), physical geographical features (such as waterfalls, glaciers, springs, rock formations, etc.), water-oriented features (such as beaches, natural harbours, etc.), and cultural historic features (such as archaeological and historical sites).

RECREATION FEATURE MAP UNIT

An area of land or water which is composed of a discrete combination of natural elements (vegetation, water etc.) which, from an inventory point-of-view, exhibit a uniform attractivity in relation to the feature or features found therein.

RECREATION FEATURE SIGNIFICANCE

A recreation features "attractivity" or ability to hold a persons interest. Quality is the primary basis for assessing feature significance. The significance of any one feature is assessed on the basis of that kind of feature only. For example, a wildlife feature is rated only in relation to other similar wildlife features. There are five classes of feature significance in the classification system described in this manual.

SOIL

Soil is generally defined as a loose (unconsolidated) material which occurs naturally on the earth's surface and which serves as a natural medium for the growth of land plants. Soil characteristics evolve from the interaction of parent rock, climate, plants, animals, and topography over a period of time. The end product is a material which may differ significantly from the underlying parent material in many physical, chemical, mineralogical, biological and morphological properties.

SOIL ASSOCIATION

A sequence of soils of about the same age, derived from similar parent materials and occurring under similar climatic conditions. Individual soil units within a soil association are differentiated on the basis of relief and drainage.

SURFICIAL DEPOSITS

Consists of unconsolidated residual, fluvial, marine, lacustrine or glacial sediments occurring on the earth's surface overlying bedrock.

TERRAIN MAPPING

The Terrestrial Studies Branch terrain mapping program divides the land surface into individual terrain units on the basis of geological materials, material texture, morphology of the unit's surface, and types of erosion and/or other processes which are acting, or have in the past acted, on the surface. As used here, the term "terrain" is not synonymous with "topography" although topography is one element of terrain.

VEGETATION SUCCESSION

A progressive replacement of plant species by other plant species towards a more stable community of plants, stability being reflected in the degree of harmony between the plant community and other environmental conditions at a site.

VEGETATION TYPE

A "site" within a forest zone which is homogeneous with respect to vegetation structure, species composition and species distribution. Vegetation type mapping is the most detailed type of vegetation survey undertaken by the Terrestrial Studies Branch.

ZONAL

A descriptive term applied to soils and vegetation types with characteristics which reflect the dominant influence of regional macroclimatic factors in their development.

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Department of Regional and Economic Expansion. 1969. Land Capability Classification for Outdoor Recreation. Ottawa, Ontario.

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McGraw Hill Dictionary of Scientific Terms.

Stiegler, Stella. 1976. A Dictionary of the Earth Sciences.

Example Legend for 1:50 000

OUTDOOR RECREATION FEATURES MAP

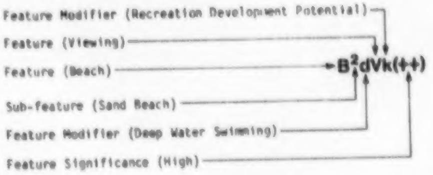
1. Explanatory Notes

Outdoor recreation features are aspects of the landscape which provide opportunities to engage in outdoor recreation activities.

Each recreation feature map unit may be assigned up to six separate symbols: feature symbol; sub-feature category; feature modifier; feature significance; recreation activity symbol; and feature annotation.

2. Example

MULTIPLE FEATURE


Feature Modifier (Recreation Development Potential)
Feature (Viewing)
Feature (Beach)
B²dVk(++)
Sub-feature (Sand Beach)
Feature Modifier (Deep Water Swimming)
Feature Significance (High)

A unit with a sand beach fronting water with opportunities for deep water swimming accompanied by significant viewing opportunities and potential for camping.

3. Recreation Features and Sub Features

4. Feature Modifier

LIST OF APD TECHNICAL PAPERS

The TECHNICAL PAPER is one of four Regular Publication series produced by the Assessment and Planning Division. TECHNICAL PAPERS deal with methods of data collection, analysis techniques, classification systems and interpretive methods developed or used by the Division.

This series replaces the former Resource Analysis (R.A.B.) series.

APD TECHNICAL PAPER 1	- Aquatic System Inventory (Biophysical Stream Surveys). Chamberlin.	$2.00
APD TECHNICAL PAPER 2	- Aquatic Survey Terminology. T.W. Chamberlin.	$2.00
APD TECHNICAL PAPER 3	- Data Entry Procedures. D. Belford, T.W. Chamberlin.	$2.00
APD TECHNICAL PAPER 4	- Climatic Capability Classification for Agriculture in British Columbia. ...	$2.00
APD TECHNICAL PAPER 5	- Preliminary Wetland Managers Manual - Cariboo Resource Region. G.G. Runka, Dr. T. Lewis.	$3.00
APD TECHNICAL PAPER 6	- Soil Interpretations for Forestry. T. Vold.	$2.00
APD TECHNICAL PAPER 7	- Herbarium Plant Species List	$2.00
APD TECHNICAL PAPER 8	- Outdoor Recreation Classification for British Columbia. J. Block, V. Hignett.	$4.00
APD TECHNICAL PAPER 9	- Forage Capability Classification for British Columbia: A Biophysical Approach. D.A. Demarchi, A.P. Harcombe.	$2.00
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